The Commercial Car Journal

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COMMERCIAL CAR CONVENTION AT DETROIT, MAY 5th AND 6th

Following the report of the Commercial Vehicle Committee, the manufacturers in the National Automobile Chamber of Commerce at their quarterly meeting held recently selected May 5th and 6th as the dates, and Detroit as the place for a convention of commercial car interests, following the regular monthly meeting of the directors, which will also be held at Detroit.

To this gathering will be invited all the leading truck manufacturers including those not members of the N. A. C. C., so that the results may be thoroughly representative of the whole trade.

The Commercial Vehicle Committee, of which Windsor T. White is Chairman is arranging to have important papers presented on the various subjects and problems of the business.

Evidence that the recent shows at the Grand Central Palace at New York City and the Coliseum at Chicago broke all records for attendance and the amount of business done was shown by the repart of S. A. Miles. The surplus of the shows, all of which is distributed among the members, makes the cost of the exhibition space a very small item of expense to the makers. There will be a 97 per cent. return of the amount paid for space at the New York City show, and 83 per cent. on the Chicago exhibition space, figures never before approached and made possible by the extraordinary attendance. Next year's show at New York City will open at the Grand Central Palace on New Year's Eve, with the Chicago exhibition beginning January 22nd.

Reports by Wm. E. Metzger, chairman of the Traffic Committee, show that February shipments of automobiles were 11,064 carloads, a substantial increase over the figures for February, 1914, which were 10,572 carloads.

In his report on behalf of the Legislative Committee, Herbert H. Rice, Chairman, stated that forty-eight bills affecting the use of motor cars had been introduced into four state legislatures during the past 3 months, but reported further that there was a general disposition on the part of the law makers to recognize the rights of automobilists, and they apparently were disinclined to vote for any measures that would entail a hardship on the one and a half million users in this country.

The Studebaker Corporation and its subsidiary companies show net profits of $4,441,966.16 for the year ended December 31, 1914, as against $1,772,473.65 for the year of 1913, an increase of $2,669,492.51, or 150.6 per cent. This is the company's best report since it has been in business and does not include large orders received during the latter part of the year, supposedly from belligerent nations.

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BRITISH GASOLINE PRICES

Quotations on gasoline or petrol in Great Britain on February 17, 1915, were as follows:

	per British gallon	
Pratt's Perfection	1s	9d
Pratt's No. 2	1	7
Taxibus	1	6
Shell	1	9
Shell II	1	7
Crown	1	6

It was stated in the quotation that these prices were at that time prevailing throughout Great Britain. In order to reduce these prices to United States forms, it is necessary to take into consideration the fact that the British Imperial gallon equals 1.20032 United States gallons, and that the exchange rate is now £1 = $4.80. This list will then read:

	per U. S. gallon
Pratt's Perfection	$.35
Pratt's No. 2	.32
Taxibus	.30
Shell	.35
Shell II	.32
Crown	.30

The prevailing prices of gasoline in the United States range from 10 cents to 18 cents, averaging around 13 cents.

SUMMER MEETING OF SOCIETY OF AUTOMOBILE ENGINEERS TO BE HELD JUNE 14–17

The summer meeting of the Society of Automobile Engineers will be held on board a vessel leaving Detroit on the afternoon of June 14th, for Georgian Bay, in and about which a cruise will be made, returning to Detroit on the afternoon of Thursday, June 17th.

The vessel selected for the outing is the steamship Noronic, the flagship of the Northern Navigation Company's great fleet of steamers. The Noronic is 385 ft. overall, and has a hull and six decks of solid steel. She carries an unusually powerful wireless telegraph system.

The committee has reported that the steamer is luxuriously appointed, and could not be better suited to the needs of the meeting if it had been specially designed for the purpose. The adequacy of her dining room and galley is good to contemplate. The portion of the boat in which the technical sessions, of which there will be five, will be held, is spacious and suitably adapted to the orderly and satisfactory conduct of the sessions.

The officials of the line and the Meetings Committee are working hard to provide the most successful and instructive vacation technical meeting trip the society has had. Every effort will be made to meet the needs and wishes of the members, who are asked to co-operate to make the meeting as creditable and enjoyable as possible, a red-letter meeting which will have to be extremely good to surpass the best the society has held.

The trip will be similar to those conducted by the society during the summers of 1912 and 1913, but a different and justly famous region of the great fresh-water seas will be visited.

Hess-Bright Manufacturing Company, Front and Erie, Philadelphia, Pa., announces that, notwithstanding reported obstacles to the importation of ball bearings, it continues to receive great quantities from its Berlin works, since September 15th having received 375,000 bearings of assorted sizes.

Sternberg Motor Truck Company, West Allis, Milwaukee, Wis., announces that it has just completed a shipment of the first hundred of a quantity order for its Sterling three-ton worm-drive model to the Allied governments. These trucks are destined for French and not for Russian ports, as has been reported. The company states that a large quantity order for its product was offered by the Russian Government, but the inability at that time to produce the trucks in the very limited time demanded, as well as on account of its shops being filled up with other foreign business, necessitated the rejection of the Russian order.

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PREST-O-LITE COMPANY GETS DECISION IN ITS FAVOR

The Prest-O-Lite Company in its suit against the Little Rock Headlight Company, of Little Rock, Ark., was granted a decision in the United States Court of Appeal for the Eighth Circuit to the effect that it is unlawful for anyone to refill a Prest-O-Lite tank without first destroying its identity as a Prest-O-Lite tank by removing the Prest-O-Lite name and trade mark. Last spring the United States District Court for the Eastern District of Arkansas held that it would be sufficient for the refiller to cover up the Prest-O-Lite trademark with a paper label. The decision of the United States District Court has been modified by the Circuit Court of Appeals so as to enjoin the defendants from "selling, exchanging or delivering such a tank without first permanently obliterating and removing the trademark and other marks by letters or figures indicating that the tank is a Prest-O-Lite tank, and securely fastening to it a conspicuous notice that the tank is not filled with Prest-O-Lite gas. The refillers and dealers are enjoined from using the word Prest-O-Lite in any way in selling refilled tanks or otherwise leading the customer to believe that such refilled tank will receive Prest-O-Lite exchange or repair service or infringing in any other way on the right or goodwill of the Prest-O-Lite Company.

DETROIT TRAFFIC ORDINANCES TO BE STRICTLY ENFORCED

Detroit's new traffic ordinance went into effect March 1st, and Police Commissioner Gillespie promises strict enforcement of all provisions. Chief of these are that all horse-drawn vehicles must carry a tail light, as must motorcycles, this provision having been bitterly contested by team owners; headlights must be dimmed within the city limits, and side and tail lights must be kept burning brightly, the latter so placed as to shine upon the license plate. Parking of motor cars within 75 ft. of a street car is prohibited.

CHANGE IN FLINT PRICES

On pages 24 and 36-D of our February issue, we gave details and prices of Flint commercial cars, made by the Durant-Dort Carriage Company, Flint, Mich. The prices given are, unfortunately, the 1914 prices, and in order that any misunderstanding may be removed from the minds of our readers, we give below the correct prices:

Chassis	$1275
Wood panel or screen side	1435
Express with top and curtains	1420
Open express	1345

These prices are for pneumatic tire equipment; solid tires, $85 less.

Speedwell Motor Car Company, Dayton, Ohio, Creditors' Committee report assets $356,640 and liabilities $465,315. Carl R. Green has been appointed receiver. He offers a proposition to unsecured creditors through which they will receive 7 cents on the dollar for their claims.

Motokart Company, with offices at 1790 Broadway, New York City, and plant in Scranton, Pa., has been petitioned into bankruptcy. The petitioning creditors are: Power Wagon Publishing Company, $622; Johnson Publishing Company, $196; Indian Refining Company, $50.

Personal Items

P. K. Hexter has become eastern district sales manager of the Republic Motor Truck Company.

George H. Bowler has been appointed manager of the Lauth-Juergens Motor Car Company, Fremont, Ohio.

H. T. Boulden, formerly manager of the Service Recorder Company, Cleveland, Ohio, is now connected with the Chase Motor Truck Company, Syracuse, N. Y.

E. R. Madden, for several years connected with the Chase Motor Truck Company, has become division sales manager, with headquarters in Kansas City.

Herbert N. Leonard, for 12 years connected with the selling force of the Armour Company, Chicago, is now general sales manager of the Ferro Machine & Foundry Company, Detroit.

Harry Orr, formerly of the American Locomotive plant at Providence, R. I., has joined Warner Gear Company, Muncie, Ind., in the capacity of production manager, taking up his duties March 1st.

Albert H. Doolittle, 307 Free Press Building, Detroit, Mich., has closed his automobile trade paper advertising agency and has become advertising manager of the Zenith Carburetor Company, of the same city.

G. J. Loomis, formerly of the Speedwell Company, is now factory representative of the Firestone Tire & Rubber Company, with headquarters in New York City, where he is giving special attention to foreign orders.

R. Stanley Smith, designer of the Smith-Milwaukee motor truck and chief engineer of the A. O. Smith Company, of Milwaukee, Wis., has resigned and will take up work as consulting engineer, with offices in Detroit, after May 1st.

T. H. McGiehan, vice-president and general manager of The Motz Tire & Rubber Company, has resigned his position, effective March 1st, to go in the rubber supply business in New Orleans. He will represent several tire and sundries manufacturers.

W. S. Dodds, formerly district sales manager of the Maccar Company, has become division sales manager of the Chase Motor Truck Company. He will establish headquarters at Buffalo, N. Y., and will cover part of the State of New York, western Pennsylvania and eastern Ohio.

William J. Slater has resigned from the Durant-Dort Carriage Company, Motor Wagon Department, Flint, Mich., to become manager of Sales Promotion Department of the Firestone Tire & Rubber Company, Akron, Ohio. He was formerly advertising manager of the Firestone Tire & Rubber Company, having resigned that position in 1908.

B. E. Blackley, formerly asistant general manager of the Falcon Cyclecar Company, Staunton, Va., and Cleveland, Ohio, has become manager of J. C. Tucker Company, Providence, R. I., State agent for the Chase Motor Truck Company. The Tucker Company has recently taken over the building of the General Fire Extinguisher Company and will at once make extensive alterations.

Albert S. Holly, for several years with Alvin T. Fuller as manager of the truck department of the Packard in Boston, has severed his connection with that company to assume the management of The J. C. Tucker Company, distributor for Chase trucks in the Boston territory. The J. C. Tucker Company is a newcomer in the truck field in Boston, but for a number of years has handled the Chase line as distributor in Rhode Island. The new company will maintain office and salesroom at 68 Brookline Avenue, Boston, with service station in Cambridge.

Changes and Factory News

Blair Motor Truck Company, Newark, Ohio, increased capital stock from $100,000 to $225,000.

Campbell Manufacturing Company, Jackson, Mich., manufacturer of auto trailers, has been succeeded by the Jackson Auto Trailer Company.

Garford Motor Truck Company has consolidated its New York City interests by establishing them under one roof at 427 West Forty-second Street.

The Warner Gear Company, Muncie, Ind., has recently added about $60,000 worth of new equipment to take care of the heavy increases in production which will be in force at their factory during the next 5 or 6 months.

Studebaker Corporation, Detroit, is erecting new four-story plant 220x80 ft., which will have 70,000 sq. ft. of floor space, and costing $85,000. The first three floors will be used for stamping fenders, oil pans, splash guards, etc.

Mosler, A. R., Company, New York, manufacturer of spark plugs, has bought four-story plant 272 ft. long, formerly occupied by the Hodgman Rubber Works, New York City. The Mosler Company will place the screw department in the basement and the main floor will be used as a shipping room, stock room, tool room and receiving department, while the upper floors will be used as offices.

The Timken-Detroit Axle Company has announced the purchase of the plant, building and machinery of the Metal Products Company. This expansion is made necessary by the quantity of new business recently taken on by the Timken-Detroit Axle Company. Prominent among the new contracts recently made are those of the Hudson Motor Car Company, the Chalmers Motor Company and the Saxon Motor Company. It is understood that this plant will probably be devoted to the manufacture of the smaller sizes and types of Timken-Detroit axles now in demand on high grade moderate priced cars.

American Standard Motor Company, Indianapolis, Ind. Capital $100,000, to manufacture and sell autos and auto trucks. H. B. Gardner, J. P. Gardner and Loe A. Gardner.

United Motor Truck Company, Grand Rapids, Mich., has just been formed for the purpose of manufacturing United trucks, and has taken over the Parcel Post Equipment Company, the Decatur Company and Grand Rapids Company, which were local concerns manufacturing trucks on a small scale.

Hoffberger, Henry, erecting commercial garage at 430 High Street, Baltimore, Md.

Morse, S. R., Richford, Vt., erected garage and is conducting repair shop, handling supplies, etc.

Kalamazoo Motor Truck Company, Kalamazoo, Mich., is now manufacturing trailers in addition to the one and a half ton truck.

Campbell Manufacturing Company, Jackson, Mich., manufacturer of auto trailers, has been succeeded by the Jackson Auto Trailer Company.

H. J. Koehler S. G. Company, Newark, N. J., recently placed the following one-ton truck agencies: Carson & Morrison, Shelbyville, Ind.; S. W. Curtis, Cheshire, Mass.; Meyer Hardware Company, Batesville, Ind.; Charlottesville Hardware Company, Charlottesville, Va.

The CCJ has most advertisers because it gives them biggest returns

Is High Initial Cost Retarding the General Introduction of Motor Trucks?

By R. W. HUTCHINSON, JR.

THE initial cost of any commodity must be justified either in the intrinsic value the article possesses or in the potential money saving (or money earning) value it carries with it. Actual intrinsic value is not unfrequently an unfair measuring rule in deciding whether the article or mechanical appliance is worth the price asked. The potentialities of service given in either time, labor or money saved, is the true gage as to whether the initial cost of the particular article is a just and reasonable price.

These fundamentals of economics apply very forcefully to the question as to whether the present initial cost is a large factor in retarding the general introduction of motor trucks. The writer must say unqualifiedly that the present high initial cost of motor trucks is the chief reason for the relative slowness with which motorized delivery has been utilized by the general business public.

On the other hand, the general business public, through its own short-sightedness, has not helped the truck manufacturer solve the problem of reduction in the present "high" initial cost of a motor truck. The present cost of motor trucks is high or not, depending upon one's individual opinion as to what is a proper and legitimate return in profit from a given amount of money invested in any particular mechanical or business equipment. This question depends more particularly upon the individual's intelligent utilization of motor trucks so as to get the latent or potential service or money earning capacity from his motor-truck investment.

The high initial cost of motor trucks is the largest present deterrent to the rightful popularity of motorized delivery. It is partly the motor truck industry's and partly the general business public's fault that the present high initial cost of motor trucks obtains. The truck industry's fault lies in unsound selling methods and unreasonably "spoiling" of the business public, which it is human nature to accept, in assuming an altogether ludicrous paternalistic attitude toward the customer in the assumption of service or operating responsibilities.

Even in this advanced stage of the motor-truck industry, I hear clean-cut business men, possessed of a high sense of business and personal morality, exclaim, with a deprecatory shrug of the shoulders, "If the truck manufacturer is fool enough to give me all I ask, I am going to ask for more!"

Until the "service-cancer" of the motor-truck industry shall have been thoroughly extirpated, we shall continue to see the present "high" initial cost of motor trucks. It can be shown that the present high cost of motor trucks is warranted by a condition for which both the public and the truck industry must be held accountable. The violet light of education of the truck user is gradually destroying the service-cancer. But the general public has continued to make it so hard, has surrounded the truck manufacturer with so much selling resistance that the present prices of motor trucks must be maintained until the business public shall come to a full understanding of the fact that there is a great mutuality of interest between the truck manufacturer and truck user, discarding their suspicion and distrust, accept the motor truck as the only modernized institution of highway transportation, and, buying it in quantity, shall enable the truck industry to entirely revamp and reorganize its present relatively small production, which is connected with excessive gratuitous service, this being the main factor in the present high cost of motor trucks.

One can purchase passenger motor-car value for $1500 that even 3 years since could not be obtained for less than $2750 to $3000. Why? The public has accepted the passenger motor car and demanded a large quantity. Annual production of some of the passenger-car manufacturers has increased 100 to 1000 per cent. in 3 years, carrying with it all the economies of manufacturing incident to the volume production and, consequently, yearly reduction in price of passenger vehicles.

Contrast this with the motor truck, the price of which to-day, for a first-class machine, is not a dollar less than it was 3 years ago, and the production of which, in hardly more than one or two manufacturers' experience, has not increased over 30 to 50 per cent.

If the general utilization of motor trucks by the public had increased in the last 2 years to even 25 per cent. of the increase in the popularity of the passenger motor vehicle, one would see selling prices on motor trucks reduced in even a greater ratio than has been the history of the passenger motor-car industry. The truck manufacturer building a vehicle of nearly equivalent price, does not make anything like the final profit that the passenger motor-car manufacturer does, since it is well known that the business man who owns a $3400 passenger car and a $3400 motor truck is ashamed—in fact, does not think of making one-third of the free demands upon the pleasure-car seller that he does upon the motor-truck seller. Psychology cannot explain this, but it is a fact that, when we can afford an article of luxury, we pay the high initial cost and the high maintenance cost without a murmur; but when the article of utility we possess goes wrong, we rarely consider it our or our employee's fault.

Irresponsible competition has been a factor in keeping the cost of motor trucks high. The lack of any mutuality of interests and the consequent calumnies which individual manufacturers have perpetrated against their competitors has been a factor in causing the public to think that the motor-truck industry is a band of commercial pirates to be carefully avoided; hence, "ought-to-be-users" are not users of motor trucks. Volume production is yet unknown in the commercial-car industry, and the cost of manufacturing and selling being unduly high, the present high initial cost of motor trucks remains.

However, the writer believes he can prove to any reasonable man that at the present prices, for the sake of illustration, of two, three and five-ton trucks of the best quality of $2800, $3400 and $4500, respectively, are fair prices, and in every installation where a motor truck has any right to be used and is rightly used.

Viewed from a transportation efficiency angle, the present high initial cost of motor trucks is not a retarder to the popularity of motor trucks in a theoretical sense; in a practical sense, transporation principles are so little regarded by motor users, due largely to the neglect of transportation education by the motor-truck industry, that only relatively few users of motor trucks do get anything like the potential profit inherent in motor trucks.

The next few years will see a more general utilization of motor trucks and greater simplicity in motor-truck design. This simplicity, coupled with the volume production which is bound to come, will be the instrument through which the present high cost of motor trucks will no longer obtain with the elimination of the absurdities of the paternalistic policies of service.

Autocar Company, Ardmore, Pa., at its annual meeting re-elected David S. Ludlum president, John S. Clarke vice-president, Louis S. Clarke vice-president, Edwin A. Fitts secretary and treasurer and Frank C. Lewis assistant secretary and treasurer.

Couple-Gear Freight-Wheel Company, Grand Rapids, Mich., elected following officers: W. C. Hopson, president; A. J. Brown and G. P. Hummer, vice-presidents; M. H. Hopkins, secretary-treasurer. The directors are the officers and Alexander Dodds, F. E. Brown, A. B. Knowlson, M. B. Church and M. C. Church.

Adams Brothers Company, Findlay, Ohio, recently elected following officers: Dr. N. L. MacLachlan, president; Murray Irwin, vice-president and general manager; G. M. Carter, secretary. These, with E. C. Edwards, W. F. Hosler, W. A. Hollington and J. G. Kiviss, form the directorate. F. E. Liddle, formerly of Jackson, Mich, has been appointed factory superintendent.

Denby Motor Truck Company, Detroit, Mich., at its recent annual meeting of stockholders re-elected the old officers with the addition of Henry Lansdale as vice-president. Hereafter he will be closely associated in the business, taking an active part in the executive direction of all departments. Mr. Lansdale has had a wide experience in business management and efficiency effort.

The American Bronze Company, Berwyn, Pa., announce that two more motor truck makers—The Dorris Motor Car Company, St. Louis, Mo., and The Lange Motor Truck Company, Pittsburgh, Pa., have been added to the already large family of Non-Gran Bronze Bearing users.

The CCJ has most readers because it gives most information

KANSAS CITY TO HAVE COMPLETELY MOTORIZED MAIL DELIVERY

The Post Office Department of this city is so well pleased with the delivery service rendered by the motor trucks recently installed that one more car was added to the service February 1st, and now it is proposed to replace all wagons with automobiles. If the Post Office Department at Washington approves the plan, a complete motor delivery system will be installed in July.

Some stations in the city are receiving double service in the removal and delivery of mails since the autos were brought into use, toward the close of 1914. This will be true hereafter in the wholesale and manufacturing district, at station "A," where the new car will be used. Mail is now carried from the Union Station in Kansas City directly to station "A," instead of passing through the main office, and being delivered from there via electric cars on the street railway lines. The service expedites the movement of outgoing mails also. The electric cars will still be used in handling city mails.

A Ford car, owned by William Lindley, has been fitted with a screen body according to the standard Government specifications, and will make seven trips daily from the station to the depot. The Government specifications require closed front and back, and curtains on all sides. Four other Ford touring cars are in use under a contract with the Northwestern Garage and Storage Company, of Kansas City, Kans. A two-ton Reo truck and a Chalmers car, rebuilt from a model F touring car, are also in the service under the same contract, making seven cars in all.

The trucks handle parcel post mail mainly. Twelve contract stations, through which large volumes of package mail is carried, are located about the business district, and are visited on regular schedules by the collection cars. The cars are run under 8-hour contracts. Half of the machines start out from the main office at 8 o'clock in the morning and make the deliveries of parcel post matter which cannot be handled by the postman. At 10 o'clock the remaining machines report for work and finish the deliveries. As each car becomes available for collections it is sent out on a route, and if the demands warrant, it goes to the outlying stations. A trip is made to one of the distant stations each morning, and on the return as many contract stations are visited as the machines' capacity will permit. The value of the trucks is apparent, but no exact data has been kept to show how the volume of deliveries made by automobiles compares with those made otherwise. There are four contract wagons and twelve carts in use at present. These will be replaced if the plans of the postmaster are carried out. The motor trucks are making possible an efficiency never before possible and several new stations may be established also as a result.

The Pacific Coast Baking Company, Los Angeles, Cal., has ordered three Republic trucks.

Sonoma County Transportation Company has started a motor 'bus line which will make two trips daily between Napa and Rosa, Cal.

The managing engineer of one of the government railways in Ecuador has bought the first motor truck sold in that country. It will be used in railway work.

Auto Transit Company, Fort Worth, Tex., has incorporated with a capitalization of $9000. T. F. Turner, et al., incorporators.

Donald Lathrop, proprietor of one of the La Salle-Oglesby Auto lines, has started an auto service between Peru and Granville, Ill.

E. H. Parkhurst, vice-president of the Peerless Motor Car Company, and the Yuster Axle Company, of Cleveland, Ohio, has purchased the majority stock of the latter company from M. L. Yuster, and has assumed active management. Mr. Yuster still retains an interest in the company and is on the Board of Directors.

The Lep Transport & Depository, Ltd., Castle Street, Longacre, London, W. C., has published an extra guide for the motor trade which contains a great deal of useful information relating to the carting of cars for export, shipment of cars, insurance, etc., as well as details on a number of makes of cars, sold in the United Kingdom, the approximate number of cars in various countries, foreign and colonial custom duties, etc.

The Tables Are Turned

Views recently taken in New York, after a snow flurry. In numerous instances throughout the city, horses were unable to start their loads, and friendly truck drivers hitched chains to the poles of the wagons and gave them the needed assistance. Horses were down in many places, blocking traffic, as shown in one of the accompanying views. It was not so many years ago that it was the horse that was needed to pull the motor-driven vehicle, but today the tables are turned.

The Way of the Horse is Hard

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WAR PROVES DEPENDABILITY OF MOTOR-DRIVEN TRUCKS

TRUSTWORTHINESS, dependability, efficiency, are demanded by modern business from mechanical appliances upon which captains of industry rely. Although substitution of mechanical for animal power has now been in progress for many years, it has remained for the armies of the world to demonstrate to the commercial world the triumph of the motor over horse power.

This war has demonstrated beyond the possibility of question the dependability and general utility of motor-driven trucks. Gasoline and gunpowder have, for the first time, shared equally in producing the results of war. High-powered explosives confined within the big gun have been no more effective in reducing the enemy than gasoline confined within the cylinders of the engines of motor-driven vehicles.

The merchant thinks that everything depends upon the delivery of his 5- or 10-cent parcel within a specified time, and therefore demands the utmost reliability of the vehicle which carries it. How much more depends upon the delivery of thousands of troops which must be concentrated at a single point within a definite time, or the entire tide of the affairs of Europe may be changed. Yet the army uses the truck without question, while business men, in many instances, still hesitate.

The events of the past ages may be classed with the Lilliputs as compared with the Titan-like occurrances which are performed hourly by motor trucks, without even calling forth a comment from the witnessing soldiers who are daily accustomed to seeing trucks perform such Herculean tasks. Entire machine shops, bakeries, hospitals, and even forts are now on wheels and moved with the speed and facility formerly possessed by none but the fleetest of trans-continental express trains on steel rails. Up-to-date trucks transport troops, ordnance and ammunition to a point, and even back again, before temporary tracks could be laid.

Transportation in the battle zone and at the front is not over *macadamized or paved streets, but over disrupted,* washed-out, blown-up tracts which once were roads, and even over soft and plowed fields; yet the captains of Mars do not wait. *They know the possibilities that lie concealed within* the truck, while the captains of industry have stood aside and hesitated to use the same means over smooth highways *with everything in their favor.*

Fifteen- to twenty-ton pieces of ordnance are being moved with a speed equal to that of the cavalry *with the issue depending upon the reliability* and the speed of this transportation, yet all of this is being done by motor-driven commercial cars.

The business world stands in surprised awe at the possibilities which the war has demonstrated are within the reach of the business man when he again settles down to repair as speedily as possible the enormous destruction and waste to which Europe has devoted itself with all the power and might of modern science.

If the business men do not appreciate now the possibilities of motor-driven vehicles for every and all service which requires absolute dependability, speed and efficiency, they are certainly blind to their opportunity.

HORSE EXPORTS SLIGHT COMPARED TO NUMBER IN THE COUNTRY

THE steady importation of horses to Europe for cavalry and other purposes continues. The effect on the price of horses, on the number of horses, and the possible results to the commercial car business are subjects of discussion. There seems to be a general belief that exportation of horses will largely increase the sale of trucks. That this effect will result from a sale of any considerable proportion of the number of horses in the country is not questioned. Let us, therefore, look for a moment at the figures as given by government statistics.

According to the 1910 census there were 3,182,789 horses not on the farms. With increase of population and haulage even in spite of the increasing use of motor-driven vehicles, this number has probably slightly increased in the last 5 years. The Bureau of Animal Industry reports an exportation of horses during the 4 months, September to December, 1914, inclusive, of 75,000 horses. This number has already been increased by several thousands in addition for the warring nations. Assuming that all of these horses are taken from those not on the farm, that is, in the cities, the total exportation represents but .02 per cent. If, however, as is more likely, a large part of these horses come from the farming communities, the percentage shrinks to an almost negligible quantity. The figures of 1910 give 21,195,000 as the number on the farms. This number, with those in the cities, makes a total of approximately 24,000,000. The 75,000 or 80,000 would be but .003 per cent. of the total, a figure so small that it can have but little effect.

The fact, however, remains that the sale of horses is liable to continue at an increasing rate and to be prolonged even after the war is closed, as the stock of the belligerent nations, perhaps with the exception of Russia, will be largely depleted. Eventually, therefore, the sale of horses may have an appreciabe effect, but it certainly cannot be considered as a material factor at the present time.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

EUROPE AS WELL AS AMERICA DEMANDS SMALL TRUCKS

We have consistently pointed out the demand for small, light, economical delivery vehicles, referring to our home market. We now find that Europe also has a market for a smaller delivery vehicle. According to A. Ludlow Clayden, Europe could use a large number of trucks of 1 ton or less capacity, if the price could be kept at or near $1000.

"It is the small kind, from 1 to 2 tons, that must appeal most strongly to the small business houses who will be turned to motors by the high price of horses after the war. It is the profound conviction of the author that there is a gigantic field for a small truck to carry a maximum load of 3000 lbs., rated therefore at 1 ton, but it is essential that the first cost be low. In the field where such a machine would find buyers, low first cost is the deciding factor. Cannot America make a truck along the ordinary lines of design—a real truck? If it can be done, there is a fortune in it."

MARKET AT HOME

The story is told of the man who, being out of employment and unable to obtain work, for lack of anything better to do whittled soft wood toys for his children. These were greatly enjoyed not only by his own, but the neighbor's children, and he soon found himself besieged with requests to make toys. Being good-natured, he acceded to the children's demands, but begrudged the time which he might have employed in seeking work. One day a friend said to him, "I don't see why you want to look for work. Don't you realize that you have a most lucrative business right here at home?" This was the beginning of one of the largest toy manufacturers in this country. American manufacturers need not go outside of this country for an enormous field, for a one-ton truck that will stand up at $1000. Right here at home is a larger market than any other country in the world can possibly offer.

Again, let us emphasize the fact that the demand which we know exists for small vehicles does not mean that there will be a diminution in the demand for large units. On the contrary, the use of small trucks builds motor users many of whom will eventually use large trucks.

Steel and Rubber Markets

Foreign Buying Chief Feature of Steel Market

Active buying of rolled steel, both finished and semi-finished, also forgings by the Allies, continues one of the most prominent features of the market. Russia has placed a contract for $30,000 worth of forgings. The steel corporation is producing steel ingots at 68 to 70 per cent. total capacity. Since the first of the month structural mills and fabricating shops have done more business than for many months, but, while volume of business was larger, prices were not satisfactory.

Quotations on March 9th were:

STEEL PRODUCTS PRICES

Bessemer steel, per ton, mill	18 00 a19 50
Open hearth, per ton, mill	18 50 a20 00
Sheet bars, per ton	19 50 a21 00
Steel bars, soft base, half ex-tidewater	1 31 a ....

The above prices are tidewater in carloads and larger lots. For quantities less than 2000 lbs., but not under 1000 lbs., $2 per ton additional is charged, and less than 1000 lbs. $8 per ton additional.

SHEETS

The following prices are for 100-bundle lots and over f. o. b. mill; smaller lots $2 per ton higher.

Gage—	Black.	Galvanized.	Gage—	Black.	Galvanized.
Nos. 22-24	1 70	2 95	No. 28	1 85	3 40
Nos. 25-26	1 75	3 10	No. 29	1 90	3 45
No. 27	1 80	3 20	No. 30	2 00	3 70

IRON AND STEEL AT PITTSBURGH

Bessemer iron	14 40 a 14 50
Bessemer steel, f. o. b. Pittsburgh	19 50 a 20 00
Skelp, grooved steel	1 10 a 1 15
Skelp, grooved iron	1 50 a ....
Ferro-manganese (80 per cent.), seaboard	90 00 a100 00
Steel, melting scrap	12 00 a 12 50
Steel bars	1 15 a ....
Black sheets, 28-gage	1 85 a 1 90
Galvanized sheets, 28-gage	.... a 3 40
Blue annealed, 10-gage	1 30 a 1 35

Rubber Market Continues Quiet

Since our last report the rubber market showed very little change, the price of high-grade Para remaining at 58 and 59 cents, except during the period from February 25th to March 3rd, when 59½ and 60 cents was demanded. The demand for tires and some other lines of rubber goods is reported to have increased to some extent of late, but manufacturers do not seem disposed to purchase beyond their current needs.

Quotations on March 9th were:

Up-River—					
Fine	58	a	59		
Coarse	47	a	..		
Island, fine	53	a	54		
Coarse	33	a	..		
Cameta	36	a	38		
Caucho Ball—					
Upper	49	a	..		
Lower	Nominal				
Centrals—					
Corinto	43	a	..		
Esm'ralda	43	a	44		
Guatemala, slabs	42	a	43		
Mexican—					
Scrap	43	a	44		
Strips and scrap	43	a	..		
Guayule	..	a	..		
Balata—					
Sheet	50	a	51		
Ciudad—					
B'k	..	a	..		
Trinidad—					
B'k	Nominal				
Africans—					
Massai, red	..	a	..		
Red C'go	Nominal				
B'k C'go	..	a	..		
Soudan—					
Niggers	Nominal				
Gambia, prime	..	a	..		
East India—					
Smk, sh'ts	66	a	68		
Ceylon—					
Bis & sheets	61	a	65		
Pale crepe	66	a	67		
Pontianac—					
P'me plantation	..	a	..		
Palembang	..	a	..		

DOMESTIC SCRAP RUBBER

Tires—Automobile	5 a ..
Bicycle, pneumatic	3 a 3¼
Wagon and carriage, solid	5 a ..
Inner tube	16 a 17

The Garford Motor Truck Company, Lima, Ohio, has started the manufacture of the Garford and Garford-Utility trucks. The Geiger-Jones Company, of Canton, Ohio, recently took over the motor truck interests of the Willys-Overland Company, which consisted of the manufacture and sale of both Garford and Willys-Utility trucks. This entire line will hereafter be known as the Garford and Garford-Utility. This enlarges the Garford range of capacity until it covers practically every need for commercial vehicles from the smallest to the largest practical size. The officers of the new company are: E. A. Williams, president; Jos. B. Immler, vice-president and secretary; A. Stull, treasurer

New-Lite Manufacturing Company, Newtown, Iowa, opened factory branch at Eleventh and Hill Streets, Los Agneles, Cal., with service station in connection. H. E. Grove in charge.

Fairmount Park Commissioners of Philadelphia have revoked the regulation which went into effect on November 15th, prohibiting the use of headlights in the park. Under the amendment now in force, searchlights may be used on motor vehicles in the park, provided reflectors or condensed lenses will not throw their rays more than 200 ft. ahead of the car. Horse-drawn vehicles going through the park are now required to carry a light on each side visible at a distance of 200 ft.

The CCJ leads in circulation, advertising and prestige

Builders' Supplies: Lumber, Sand, Lime, Cement, Etc., Most Economically Handled by Dumping Trucks

Contractors Among the Largest Dump-Body Truck Users

MOTOR haulage appealed at once more strongly to the men who were having difficulty in hauling with horses, therefore contractors were among the first to appreciate the future possibilities of substituting gasoline for oats. Naturally lavish and prodigal with their mechanical equipment, what did it matter to them if the machine went to pieces by the time the work was completed. Other machinery was expected to do this, and it has taken truck salesmen several years to convince contractors that trucks can be used beyond the completion of a single contract and should, therefore be properly cared for during the progress of the work. Most contractors now realize this, and the truck equipment, although not carefully cared for still is given more attention than formerly. The nature of the work is extremely severe, and nowhere will trucks be found more shamefully abused than by contractors, yet they are being used to a greater and greater extent in this line of work. Hardly the name of a large contracting firm can be mentioned that is not a convert to motor trucks.

Contractors' Association Secretary Makes Statement

Mr. C. A. Train, secretary of the General Contractors' Association, made the statement before the Motor Truck Club of America, last June to a contractor. "To a contractor livestock is livestock, but machinery is scrap, and machinery can be scrapped if it is not wanted, but when it can be shown that motor trucks 3 years old are operated as cheaply as new trucks * * * that these same three-year-old trucks, after traveling 30,000, 40,000 and 50,000 miles are able to do more work in less time and for less money than can livestock, there must be a reason, but this reason is never learned by the man who thinks of first cost first."

Excavations for public buildings are now largely cared for by motor truck. For instance the Public Service Terminal in the City of Buffalo, where 200,000 yards of dirt were taken out, the equipment consisted of steam shovels and Pierce-Arrow dump-body trucks.

An Average Day's Work, 250 Tons, or Fifty Round Trips of 1.3 Miles

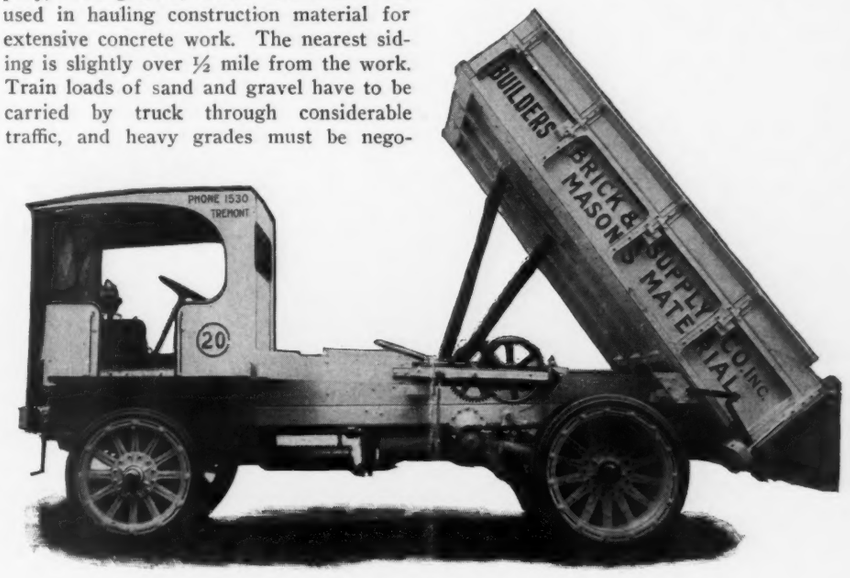
Another proof that motor trucks will eventually be used for many kinds of short haul work is that of a five-ton Pierce-Arrow truck used by McKelvey-Hine Company, Youngstown, Ohio. This truck is used in hauling construction material for extensive concrete work. The nearest siding is slightly over ½ mile from the work. Train loads of sand and gravel have to be carried by truck through considerable traffic, and heavy grades must be negotiated. The contractor to speed up the work erected two elevated storage bins at the railroad siding. Clam-shell buckets load these, and the passing trucks are loaded by gravity from two discharge outlets, with quick-acting gates. Owing to lack of space trucks must be turned and backed under the bins, yet less than a minute is required for this operation, loading and starting.

Each truck is equipped with an hydraulic rear end dump body, controlled from the driver's seat.

Quick Methods

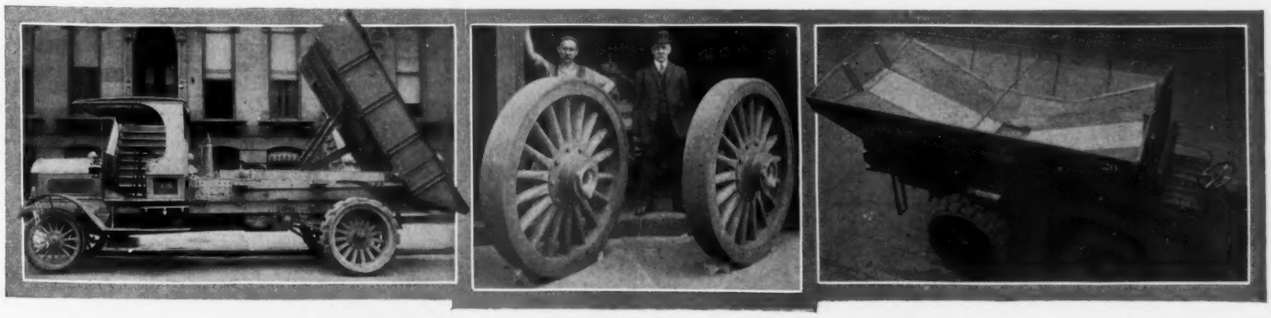
At the point of delivery there are two storage bins located half way between two heavy skew concrete arches, to carry a four-track railroad. The floor of the bins is 15 ft. above the ground, reached at either end by inclines from the street. From each bin is an opening in the floor 3x4 ft. long, protected by guard rails around the opening along the sides of the floor. The trucks are driven directly over these openings.

Two men are on each truck, one for driving, and the other takes care of the loading and unloading. This assistant operates the chutes at loading, closing one and opening the other in rapid succession,



Garford Truck With New Ideal Wagon Works Body

Attention is called to the unusual angle to which this body lifts, sufficient to discharge wet sand and other sticky material. It may be operated either by hand or motor power. Rear gate opens and closes automatically. These bodies are the result of fourteen years experience in body building by the New Ideal Wagon Works, 1845 Park Avenue, New York City.

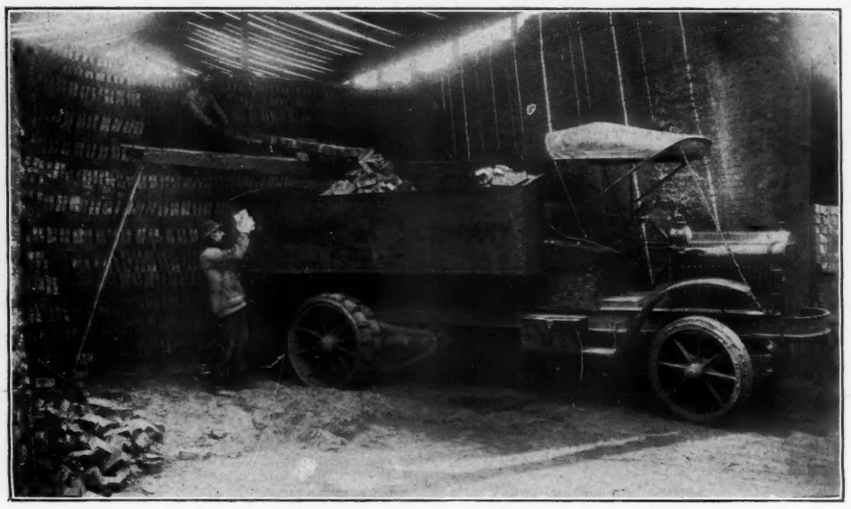


Group of Dumping Bodies Made by the Ideal Wagon Works

At the left is shown a Mack metal body. Attention is called to the extreme angle to which this body raises. At the center are the wheels for a twelve-ton trailer. Each wheel is 4 ft. 8 in. high, with 8 in. steel tire; weight 960 lbs. Wheels mounted on bronze boxes on a 4 in. axle. At the right is a bird's-eye view of a patented chute body, showing the cross bracing, and slope of sides and bottom. The chutes are galvanized-lined.

The CCJ has most advertisers because it gives them biggest returns

15 seconds being all the time required for complete load, aside from maneuvering the trucks. In delivering the load, the assistant throws the lever which starts the hydraulic lifting arm, while the truck is going up the approach. As the truck reaches the opening in the floor over the bin into which it is to deliver, the body is at a sufficient angle to start the discharge of the load. The car does not stop but delivers the load as it proceeds, and then the truck returns for another load.



Truck Earns $475 a Month at Team Rates

Based on horse costs, this truck has earned as high as $500 a month hauling brick and tile. Note the method of loading the trucks, by means of a board fitted with rollers, down which the bricks move by gravity.

Fifty Round Trips of 1.3 Miles Each Ten Hours

This system has been so well worked out that a truck being loaded and delivering its load repeatedly makes 65 miles in 10 hours, during which one hundred stops are made, and 250 to 260 tons are delivered. The statement is made by Superintendent G. H. Coates, that at least seven teams and dump wagons would be required to do the same work. This record is being maintained in spite of rainy weather, which according to the superintendent would put the ordinary dump wagon out of business for at least part of the time.

Short Hauls Also

Short hauls are now made by power equipment and to advantage. In Pittsburgh, 250 tons of sand were delivered by a five-ton Pierce-Arrow in 10 hours over a 1.3 mile haul.

Truck Fifty-six Per Cent Cheaper Than Horses on Short Haul

Another case of short-haul efficiency is given by E. E. Smith Contracting Company, New York. This concern has made as many as forty-four round trips of 1 mile each in an 8-hour day with its Pierce-Arrow truck against sixteen trips by teams. Let us compare these performances. Suppose a team costs $5 a day and hauls 2 yds. each trip. This equals 32 yds for $5, slightly over $.15 a yd. In the same time the truck carries 3½ yds. each trip, or 154 yds. a day, at a total cost not exceeding $13, which is less than $.085 a yd., showing that the motor truck is 56 per cent. cheaper on this particular job.

Single Truck Earns $475 a Month Hauling Brick and Tile

A most unusual record of efficiency was shown by a two-ton White truck used by the Akron Brick & Tile Company, Akron, Ohio. This company gives the work of the truck on a basis of what would have to be paid to do the same thing with horses, $5 a day per team. The work is done in a hilly section, which makes the record all the more remarkable. The following are the cost figures:

YEAR'S RECORD OF 5-TON TRUCK

License	$5.00	
10 hours, team hauling brick to pavement	5.00	
Insurance — accident to others	63.75	
Driver—$3 per day	927.00	
Garage rent—$5 per month	55.00	
Tools and supplies for garage	16.93	
Gasoline, 2588½ at $.16	414.16	
Jack handles	1.50	
Oil	46.16	
Tires	109.00	
Hardware—brake lining	2.28	
Wrench	.45	
Welding	.35	
Pail	.90	
Machine Repair	12.30	
Hardware	3.27	
Garage charge	11.54	
Hardware — brake lining and search light	13.60	
Welding	7.75	
Garage	2.25	
Log Chains	9.30	
Tires	219.01	
Repair—end gate	5.80	
Garage	6.30	
Curtains	2.65	
Taxes—½ year	14.18	
Hardware	3.30	
	$1958.73	
Truck earned		$4312.12
Net earnings		*$2353.39*

Mileage 9443 to Dec. 31, 1913.
Made 1804 trips from plant.
Rented 249½ hours at $2 per hour.
Hauled 3,053,565 brick—
8395 tons from plant.
620 tons drain tile and coal from plant.
9015 total tonnage in 1804 trips.
Gasoline 3.6 miles to gallon.

On team rates of $5 a day, the truck has even earned as high as $500 a month during the active season.

Couple-Gear Sand-Dumping Truck

This body is of six tons capacity, hand-operated, delivering its load at either side by gravity. It is loaded by overhead hopper buckets or steam shovel. At the left is shown a body dumping a load of sand entirely clear of the body. Attention is called to the fact that all four wheels drive and steer

The CCJ has most readers because it gives most information

Lumber Trucks

The bodies used on trucks employed in hauling lumber as a rule cannot be spoken of as dumping bodies, although arranged to deliver the load. The roller type construction is usually employed. In this business, as well as in other lines, decided economies as well as increased business results from the use of motor power instead of horseflesh.

Autocar Sand Body

This car hauled eighty tons of crushed stone from two forty-ton freight cars, a distance of a mile and a half, in two days. It would have required six horses to have finished the work in that space of time.

One-Ton Capacity Dump Truck

Dump body equipment has usually been confined to large, expensive vehicles. There are, however, some smaller trucks so equipped, notably the Koehler, which is rated at 1 ton, and is shown in the accompanying illustration with dumping body, and sells for $860.

This truck is used to carry sand, brick, tile and lumber from yard to contractor where building. The opening in rear of cab front allows long length of lumber to extend forward of the body past driver's seat.

This dumping-body model fits the regular yard scales commonly used and its size and equipment makes it very practical. The body is raised into dumping position, in a conventional manner with ratchet governed crank as shown. The floor of the body is lined with a piece of ⅛ in. sheet steel, is 8 ft. long, 48 in. wide, with 16-in. high sides, and 6 in. tight flare boards. The tail gate, which is hinged at the top, is equipped with a conventional hand operated sluice gate, which, of course, can be used with a chute.

Wood Hydraulic Hoist and Body for Builders' Supply Hauling

This GMC is fitted with a body of special construction which combines the ability to handle almost any building or road material from sand to lumber. Note arrangement for stakes. Body and hoist built by the Wood Hydraulic Hoist & Body Company, Detroit.

Close View of Wood Hydraulic Hoist

This standard truck shows ease of operation of the hoist, control levers being within easy reach of the driver while in his seat. After disengaging the clutch, engage the hoist clutch; let in the engine clutch, which causes the oil pump of the hoist to run neutral. Throwing the pump valve lever to the highest point causes the body to raise and automatically stop and lock at the highest point. It can also be stopped at any desired point by placing the valve lever at a lower position, and another position causes the body to lower to the chassis.

HOW A SAVING OF ONE DOLLAR A TON WAS MADE

By W. D. MENG

A motor truck which was bought within the last year by the Kansas City Structural Steel Company, is paying for itself at the rate of $1 a ton for material hauled. On a single job this winter an actual cash saving of $1800 over the cost of hauling by teams was effected. This was the saving, at $1 a ton, for the steel used in the construction of the new Muehlebach hotel, a fourteen-story structure just being completed. The saving exceeded this figure if estimated on the basis of figures obtained in the early tests.

A Knox-Martin tractor with two trailers was bought by the company at the beginning of the work on the hotel. Previously the firm had hauled the steel to fill its contracts by means of wagons and teams at an average cost of $2 a ton. Two to 2½ tons made a load. The material was usually hauled a distance of from 4 to 6 or 7 miles, the trip to the Muehlebach hotel being 6 miles, making a round-trip of 12 miles. The hauling would have cost $2 if done by teams.

The first day's use of the tractor resulted in an actual saving of $274 on 157 tons, after paying a chauffeur, laborers who loaded the truck, and the expenses for gasoline, etc. The saving here averaged $1.758 a ton. Two trailers were used, and while the tractor made a trip with one load the second trailer was being loaded at the yards. The trailers were the product of the Bull Dog Manufacturing Company, of Kansas City, makers of the Bull Dog dump-bottom trailers. Twenty-foot staked bodies are the type used by the structural steel company.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

Dump-Body Trucks Indispensable to Road Builders

Rochester Contractor Operates Truck at $7.50 Per Day

NOWHERE are dumping-body trucks more useful than in handling hot asphalt. The Ribstein-Holter Company, a general contractor company, of Rochester, N. Y., uses GMC trucks for this purpose with great success. Hot asphalt is hauled from the city plant to various paving jobs. A record of hauling was kept when the trucks were carrying loads from the city plant to a street 2½ miles distant. It was found that the trucks averaged 45 miles a day, making 9 trips of 5 tons each, or 45 tons at a cost of $7.50, only 16.6 cents per ton.

The greater work capacity of the motor trucks is well illustrated by one incident in a day's work. The horses and wagons reported at the asphalt plant at 3 in the morning, and left at 4. The motor trucks, however, did not report until 6.30, and left at 7.10. The motor trucks reached their first stop before the horses and wagons were ready to leave on their return trip. This, in spite of the fact that the wagons left the plant 3 hours earlier. Not only did the motor trucks make three times as many trips per day as the horses, but twice as much tonnage was carried on each load.

Trucks Reduce Time Per Mile of Road Building From Four Weeks to Four Days

The utility of motor-dump trucks in road construction work is nowhere more clearly shown than by work which has been done by the commissioners of Chatham County, Ga. The statement was made that where formerly mule teams were used it required from 4 to 6 weeks to build a single mile of permanent roadway. With motor-truck equipment they build on an average of a mile in 4 days. Fifteen mule teams and a large number of drivers have been dispensed with.

Roller Bearing Trailers Used to Advantage

Harvey Granger, the county commissioner, states that he is using, in connection with a White five-ton, dump body, good roads truck, ten roller bearing trailers. On good stretches five trailers of 3 yds. capacity each, can easily be hauled by the truck, and as a cu. yd. of the material weights 3000 lbs., the trailers alone are carrying 45,000 lbs. each trip. On a test of 45 days, the truck showed the following work hauling Augusta gravel, which weighs 2700 lbs. per cu. yd.:

Distance 1.15 miles	
Total tons hauled	4023
Total mileage	1662.5
Miles per gallon gas	1.5
" " " oil	23.0
Total cost of operation	$459.52
Cost per ton	.112
Cost per ton-mile	.10
Cost per yard	.1542
Cost per yard-mile	.134

Atterbury Truck With Wood Hydraulic Hoist
This truck is doing the work of three teams at considerable saving. Three trailers are also used under favorable conditions

GMC Dump-Body Truck Taking on a Load of Asphalt
This truck hauls nine loads per day of five tons each, making an average of forty-five miles per day, at a cost of $7.50.

Net Earnings for Month $515.58

A motor-dump truck, if it can be kept busy, as is usually the case, handling road materials, coal, etc., will soon pay for itself. The following figures show what can be done with a truck under suitable conditions. Another B. A. Gramm truck in the service of the Finch Engineering Company, of Bowling Green, Ohio, operated from 4 o'clock in the morning until 5 in the evening. The body of the truck was built in Bowling Green, and has a Wood hydraulic hoist:

Total earned by truck (at team wages)		$705.60
Gasoline and oil	$95.47	
Repairs	3.05	
Storage	5.00	
Engineer	80.50	
Changing wheels	6.00	
		190.02
Net earning for Sept., 1914		$515.58

Trucks Cut Hauling Costs From Ninety-two to Thirty-two Cents Per Ton

In Knoxville, Tenn., the Murray Construction Company is using a fleet of four GMC dump-body trucks.

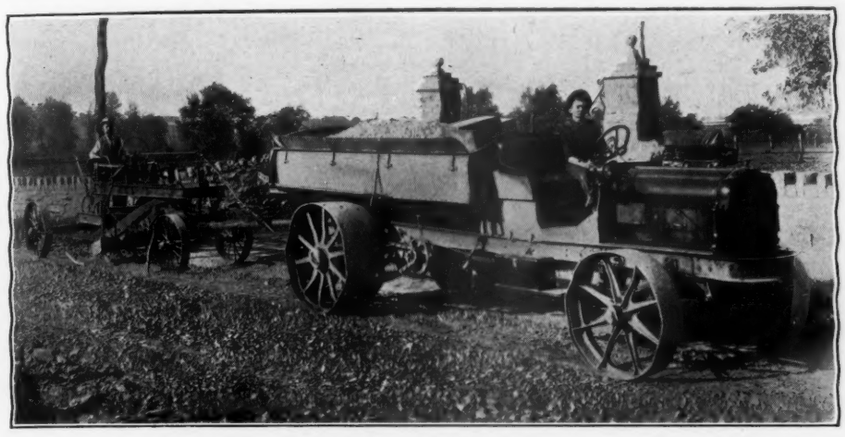
These trucks are supplied with Thermos bodies for hauling hot asphalt. The regular steel body of this truck is covered on

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

the sides and ends with air-cell asbestos, 1½ in. thick, held in place with 16 gage iron. The bottom is lined on the inside with ½ in. firefelt, and covered with 12 gage steel. This construction enables the operator to deliver the asphalt hot, on the job, any reasonable distance from the paving company's plant.

This company states as follows:

We were able to cut our cost of hauling from $.92 per ton with teams to $.32 using the trucks.



Trucks Used In Making Roads

The above illustration shows the White good-roads truck, carrying a capacity load of five tons of stone, and at the same time pulling a Scarifier in good-roads work in Fayette County, Ky.

We have no very steep hills around Salisbury, and have never given our own trucks a very severe test upon a hill, but the writer is satisfied that there is no question about the efficiency and reliability of the trucks.

Lewis trucks in use by the city of San Francisco are equipped with Lowney power hoist and dump bodies, 4 yds. capacity. They also have heat insulating bodies, being lined with asbestos, and over this a strip of iron ¼ in. in thickness was riveted. This was used as an asphalt-carrying truck, forming an insulation which kept the asphaltum as hot as possible during transit. The result has been that distant streets which it was practically impossible to care for by horses as the asphalt got cold, are now taken care of without trouble.

Trucks Paid for Themselves in Season

Last May the Westrick & Line Company put into operation two B. A. Gramm's trucks in building 4 miles of roadway. The trucks paid for themselves in a little over 7 months. The same amount of money paid out by payroll checks to the teamsters for one-half the same number of yards of stone that these two trucks hauled, paid for the investment, and this company now has its trucks which, after a thorough overhauling, were found to be in excellent condition and ready for another year's work.

Atterbury Truck With Trailer

The highway department of the town of Milton, N. Y., according to the records of the department, has been covering a daily mileage equal to 3 teams. In addition to this it has pulled a trailer carrying 3 tons. The Woods Hydraulic Hoist, operated by a single lever from the driver's seat, is used.

Trucks in road service by the New York State Highway Department, just outside of the city of New York, are averaging 10 hours per day, 10 trips, carrying from 8 to 10 tons, including the loads carried on the trailers. The gasoline and oil consumed for 10 hours making eight trips, is 4½ gals., and 1 pt. of oil.

Another instance of economy in road building is cited by L. A. Weddington, chairman of the county commissioners of Cabarrus County, N. C. He states that they purchased a White good roads truck in May, 1914, after making a test in which 26 miles of road were rebuilt in 43¼ hours. Three different kinds of roads were operated upon: clay, sand and macadam. The truck pulled 80,000 lbs. of cement 1/3 of a mile over a muddy road and a 4 per cent. grade, and during 8 successive days trailed graders and drags over the 26-mile stretch. The mileage of the truck was 202.5; total cost of operation $48.93 for fuel and oil, and only two men were employed, the driver of the truck and the operator of the road machinery.

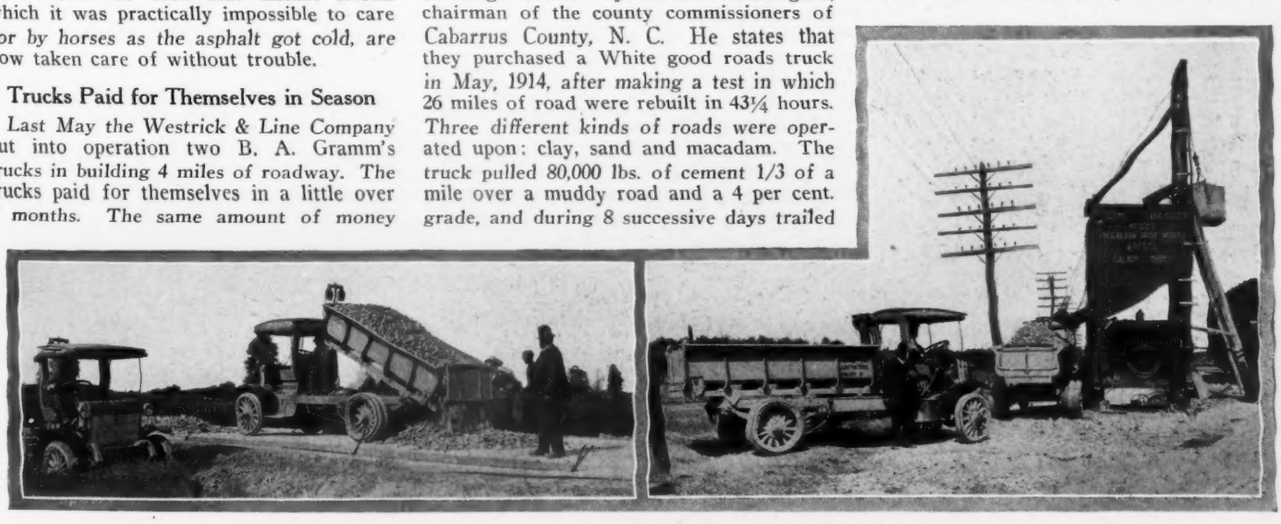
Saving $125 a Day by Trucks

The Brooklyn Alcatraz Asphalt Company, according to Patrick F. Kelly, treasurer and superintendent, has replaced thirty two-horse teams, drivers and stablemen by a fleet of nine five-ton Whites equipped with power dumping bodies. Before motor trucks were used on paving work the great problem was to keep the pavers supplied with enough material. With the trucks they are able to keep ahead of the pavers. On a 6-mile haul, from the plant to Bay Ridge, each truck takes nine loads a day, which is six more than a team of horses could make. Superintendent Kelly states that this has resulted in a saving to the firm of $125 a day on the work.

Warren Brothers Company, of Cambridge, Mass., also use White trucks with dump bodies. Each of these vehicles replaces three teams, and with trailers each does the work of at least five teams. These trucks are employed in bytulithic paving work, where the surface material must be mixed at a certain temperature, loaded, hauled, dumped and spread before it cools. Superintendent Sutcliffe says: "My comparison with previous costs indicates that under the most unfavorable conditions the trucks do the work as cheaply as horses, and under favorable conditions very much cheaper, the general average being considerably in favor of the trucks.

Truck Displaces Mule Teams of Golden Gate Park Commissioners

Over 2 years ago the city of San Francisco purchased a Lewis five-ton truck equipped with a 4-yd. side dump body. The truck was placed in the service of the Golden Gate Park Commissioners. At first it was used chiefly for hauling sand and gravel, but later, when the real value of a motor truck was realized, the truck was



Up-To-Date Contracting Methods Used by Road Builders

This shows the B. A. Gramm dump-body trucks in use by Westrick & Line, contractors. Truck at the left is tilting and spreading the load in one operation. Those at the right are being filled in the minimum time, by a special loading device operated by gasoline engine and hoisting bucket which fill an overhead hopper.

put to work doing practically everything that mules and teams had done before.

Instead of merely carrying a 4-yd. load of sand or gravel, it was used for moving hose reels and watering apparatus. The truck was also used in conjunction with trailers hauling large loads of fertilizer.

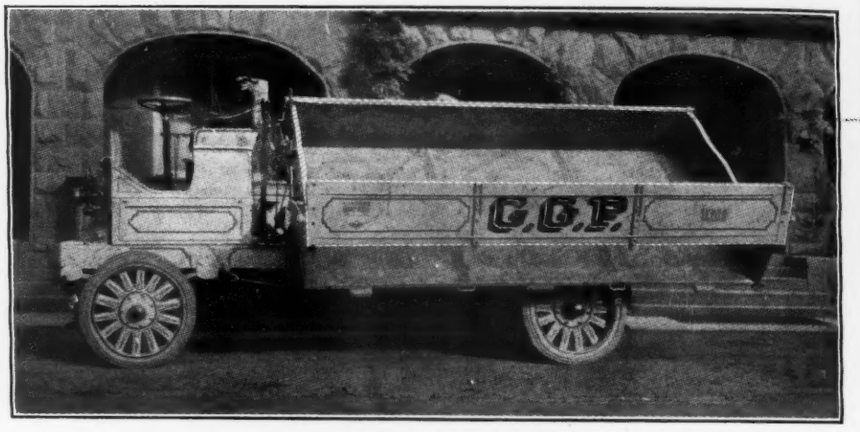
A rather unique use of the truck was made when some large palms were to be transplanted. The earth around the roots was dug up and heavy chains were then put around the base of the palms. Other chains were then fastened to the truck and the palms were pulled on to skids; the skids were then securely tied to the palms and the truck proceeded to drag them to the place where they were to be planted.

Thirty-three Per Cent Saved by Trucks in Street Paving

If economy by the use of dump-body motor trucks was confined to a few instances, there might be a question as to the efficiency of motors for this work; but the facts show economy in the most varied service. The Warren Brothers Company, of Cambridge, Mass., shows a saving of one-third by the introduction of six White dumping-body trucks, which supplanted ten of fifteen horses. The officials claim that even greater economy may be effected by changes in the yard service to conform to the use of trucks. Asphalt arrives from the company's California refineries by rail. Crushed stone and cement also arrives in car. Gravel is loaded into the trucks by gravity discharge from elevated bins, after it has been removed from the trains; asphalt from a spur track and crushed stone by an inclined cable railroad, showing the scientific methods employed in handling the materials.

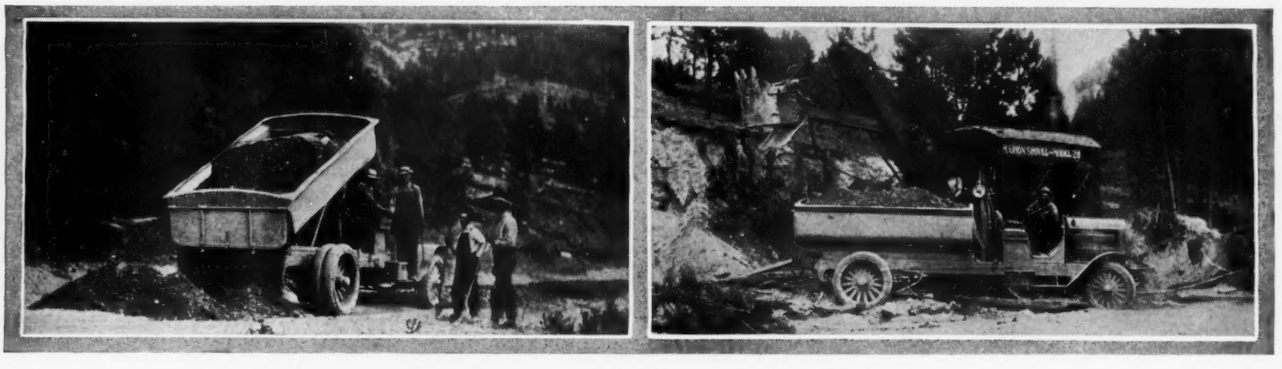
Business Extended by Trucks

Owing to the fact that asphalt, which is four teams. When trailers are used it has mixed at a temperature of 300 degrees in the Cambridge yard, must be loaded, hauled and dumped at the operation before it cools sufficiently to change the consistency, the limit of action of horses was about 10 miles in radius. The company figured $15 must be earned per day per truck to make it profitable to displace horses. It was found that each truck actually did the work of three two-horse teams, and occasionally been found that each truck displaces from five to six teams, according to conditions. Contracts as far distant as 38 miles are now being successfully cared for, with material mixed in the Cambridge yards.

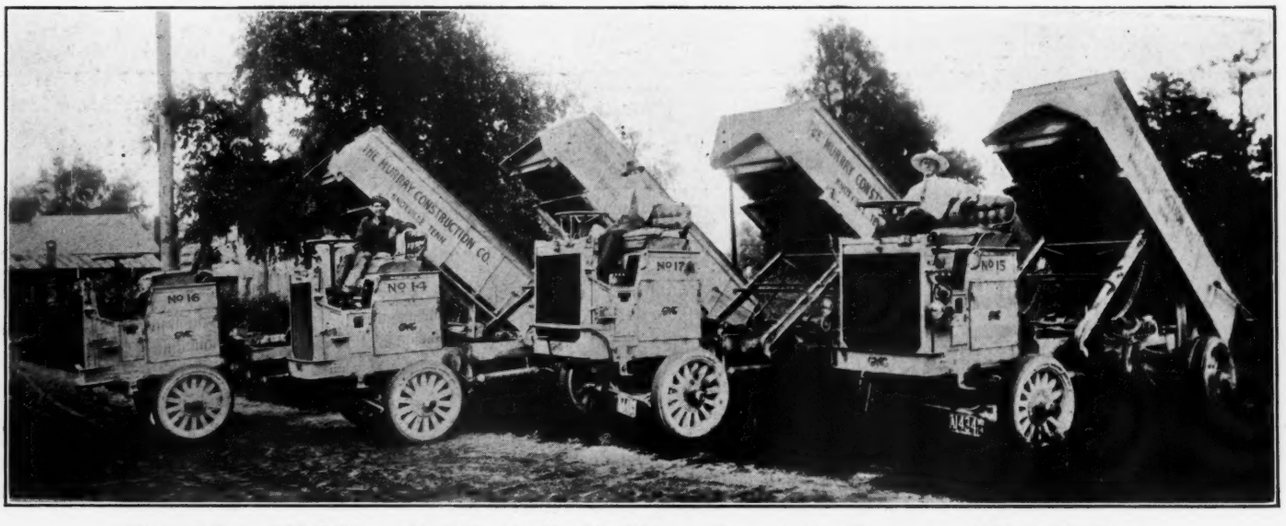


Five-Ton Four-Yard Lewis Truck

This truck is used at Golden Gate Park, San Francisco, Cal., and has a novel side-dumping body, as shown. It is built by the Lewis Motor Truck Company, of Oakland, Cal.



Kissel Six-Ton Truck in Mountain Road Work



Fleet of Four G M C Dump-Body Trucks Used by Murray Construction Company, of Knoxville, Tenn.

The CCJ has most advertisers because it gives them biggest returns

Dumping Bodies Extensively Used in Coal Delivery

Numerous Examples of Notable Saving by Trucks Over Horses
Power Methods Fast Revolutionizing Retail Coal Business

TO care for the demand for quick-acting truck bodies for the coal business, special bodies with adjustments for coal chutes are continually being devised. Instances of tremendous savings along this line are common.

An Autocar in use by Smedley & Mehl, coal and lumber merchants of Ardmore, Pa., is doing regularly the work of three double teams. As an example of a typical afternoon's work the car delivered 16 tons of coal to a residence a mile and a quarter distant from the yard, carrying it in eight trips of 2 tons each, and then delivered a load of cement at a point 12 miles from the yard. Short hauls which take a two-horse team 3½ hours are done by the car in 40 minutes, including loading, hauling, unloading and return. For one customer who lives at the top of a steep hill they were accustomed to supply four horses every time a two-ton load was delivered. The motor takes this hill with ease. The cars increased their business.

Saving on Short as Well as Long Hauls

The Chesapeake Coal Company, of Baltimore, Md., states:

"We found our first truck a great saving over the horse-drawn vehicle and were entirely satisfied in every respect, so we purchased the second in September, and expect to be in the market for more in the very near future, and hope some day to displace at least two-thirds of our horse-drawn vehicles.

"Our two cars have displaced from six to seven two-ton wagons, which is equivalent to twelve to fourteen head of horses. The cost of operating the trucks has averaged about the same as two double teams.

"The Autocar trucks will chute coal into cellars as easily and satisfactorily as our present wagon equipment of various types. The comparison of cost is as profitable with the car on the short hauls as it is on the long hauls, as we will average on short hauls from 24 to 33 miles, delivering from 26 to 34 tons in 9 hours, and on long hauls we will average from 40 to 66 miles, delivering from 18 to 26 tons in 9 hours."

Modern Methods Make Modern Efficiency; Three Hundred Tons Per Day Per Truck

The New York Central Railroad operates in New York an immense power plant for supplying light, heat, ventilation, hot water, compressed air, etc., to the Grand Central Terminal, the Biltmore Hotel, and several other large buildings. The coal consumption runs from 125 to 500 tons a day. Up-to-date methods of delivering this coal from barges which are docked ½ mile from the terminal are used. Clam-shell loading buckets, transfer the coal to overhead hoppers on the dock. These hoppers are so constructed that the Pierce-Arrow trucks which are used pass underneath, and receive their load in the twinkling of an eye. A 50-ft. loop obviates the necessity for the trucks backing. In addition to this the hopper is on wheels, so that it can be placed at the most convenient point.

The delivery of the coal at the power plant is facilitated by a 6 ft. wide, by 8 ft. long grating in the sidewalk, through which by means of the hydraulic hoist and automatic tail-gate body the load is discharged in half a minute.

Seven times an hour with great regularity this operation is repeated, the truck delivering 35 tons each hour, the total distance covered being 7 miles. As the route of the truck is up and down East 49th Street, a crowded East Side tenement section, progress is necessarily slow on account of the push carts, children, peddlers' delivery wagons, etc. There are also four avenues to be crossed, each with double trolley lines, and frequent car service. In spite of these hindrances, 350 tons of coal are delivered each 10 hours.

James Riley & Sons, New York City, made a record by delivering 324 tons of coal on January 3rd in 7 hours and 50 minutes, between the East River and the Grand Central Power Station on 49th Street. This was on Sunday, when the haul was larger on account of less traffic.

There are no delays for weighing, automatic drop scales gage the weight, and dump the coal as fast as it passes through the sidewalk grating. This is truly an example of modern power methods.

Coal hauling records are now numerous. Two hundred and thirty-four tons of coal were delivered in Chicago in 10 hours by one five-ton Pierce-Arrow over a .8-mile haul, while on a one-mile haul one of these trucks delivered 300 tons in 8 hours.

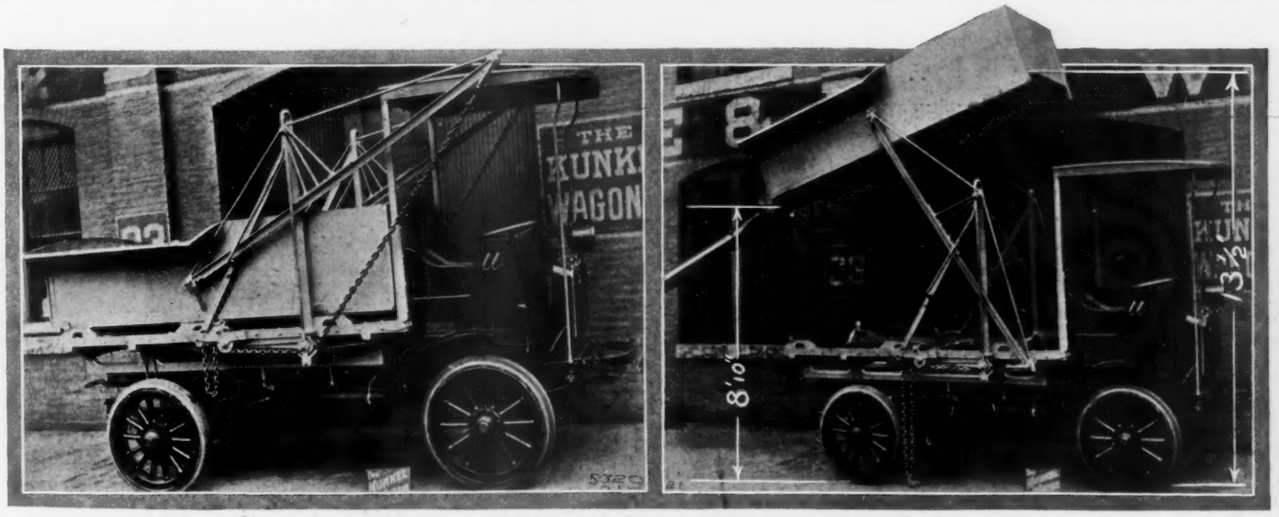
Coal Delivery in Cincinnati

Cincinnati coal merchants find delivery more expensive than in most cities owing to the extreme hills. Here motor-driven trucks show to decided advantage over horses, and merchants using trucks point to a 50 per cent. saving. Coal is now being delivered by a number of Armleder trucks for approximately 25 cents a ton, which, considering the territory and conditions, is extremely low. Even under adverse conditions the trucks have replaced from three to four teams.

These trucks are fitted with combination hand and power dumps, and hydraulic power dumps. The combination is preferred by some coal dealers, as any slight derangement does not render the dumping apparatus useless.

Proportional Increase a Factor

Aside from the saving over horse methods in the restricted area in which horses



New High-Lift Autocar Dumping Coal Body

Attention is called to the unusual height to which the body raises, 13½ ft. at the front and 8 ft. 10 in. at the rear. Arms are of bridge type

The CCJ has most readers because it gives most information

are available, motor delivery opens up an entirely new field, which is much broader and entirely impossible to horses. This is most clearly shown by the accompanying diagram, which shows the territory covered by the horse delivery service of Owen Letters Sons, of Philadelphia, and also the larger aspect of the business as developed by the cars in their service. They say: "In the 5 months that we have used our two Autocars, they have increased our delivery territory by one-third, and are bringing us business which before we had to refuse because we could not reach it satisfactorily with horses. We use the cars for long hauls and find them of astounding superiority over horses. One car does the work of five good horses, and our two cars have extended our business to points like Torresdale, Holmesburg and Chestnut Hill, which before we never tried to reach. To go to Torresdale requires a team of horses 5 to 6 hours for the round-trip. Our trucks go there and back in 1¼ hours."

Dump-Body Federal Truck

To raise the body, the driver holds the clutch out, shoves the hoisting gear into mesh, and lets in the clutch. An automatic stop throws out the mechanism when the body reaches the proper height. A reverse gear lowers the body.

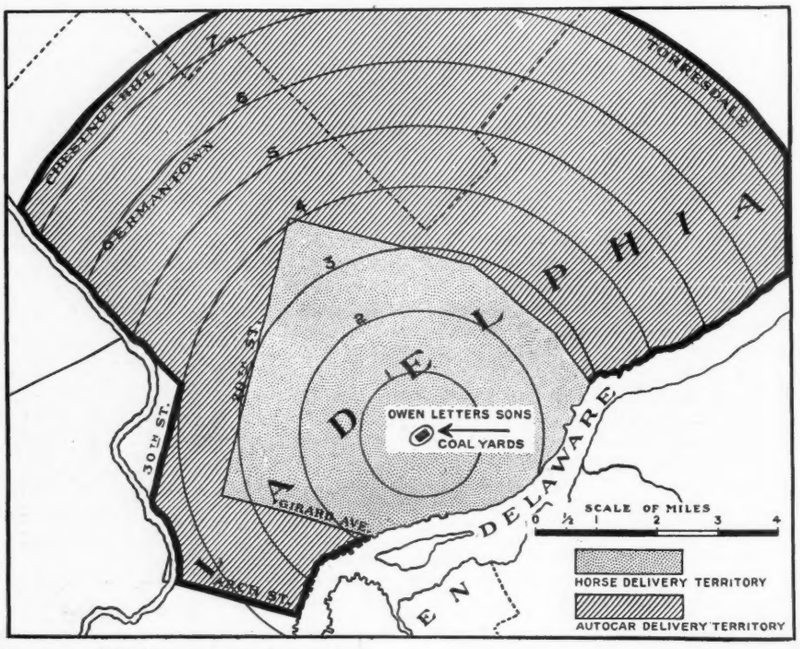


Diagram of Delivery Area Covered by Autocars and Horses in Service of Owen Letters Sons

The high lifting body permits chuting the coal 6 ft. further than from the ordinary dump-body horse wagon. In many cases where coal formerly had to be carried it is now chuted as far as 24 ft. Each car averages as high as 55 miles a day, or a monthly average of from 13,000 to 16,000 miles.

Another coal merchant makes the statement that he has increased his delivery area 20 per cent.

Little Details of Maximum Importance

Another thought which doubtless has not occurred to many a coal merchant before the purchase of trucks, is expressed by Elmer P. Aulthouse, of Gladwyne, Pa., as follows:

"My car has assisted in getting me more business because of its prompt and clean service. Where there are cement drives it does not chip the surface nor are there any horses to paw up the macadam drives."

Satisfaction of customers is of the greatest importance. No owner of suburban property enjoys having horses browse on his pet shrubbery, or paw up a well-kept driveway. These are apparently minor details, but of maximum importance.

Couple-Gear Dumping Bodies

The Couple Gear Freight Wheel Company, of Grand Rapids, Mich., provide dumping bodies electrically operated, to be used in connection with their front wheel driven trucks. These bodies are equipped with automatically operated end boards. In unloading the driver remains in his seat, simply reaching forward and turning the switch which starts the electric motor, which raises the forward end of the body. No further attention need be given to it, as an automatic stop prevents the body going beyond a predetermined angle. The driver can then start on the homeward trip at the same time reversing the motor switch, so that the body will gradually descend to its original position while the truck is running.

(*Continued on page 30*)

Seven-Ton Rear-Dump Coal Outfit

This Couple-Gear outfit carries seventy per cent of the load on the steel tires and is the type used by the Ohio Coal & Iron Company. The dump is by electric power hoist operated by switch in front of the driver.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

The New Knox Tractor

THE Knox Motors Company, Springfield, Mass., in producing their Model 35 Tractor of an unusual capacity of 10 tons, claim to have evolved a design which is far ahead of anything they have yet produced in this line of work. The experience of the Knox Motors Company with road tractors extends farther back than that of any other concern in this country, and the chassis shows that they have learned many things about building tractors which will benefit the users of this machine as well as the company itself.

Accessibility, simplicity and unusual strength are the noticeable features of the design, and in addition to these three items are some new features which have not been seen heretofore, and among which may be enumerated the following:

Hydraulic brakes, enabling the operator to exert with ease tremendous power on the rear axle brake drums and still at the same time to have delicate control. These brakes are very large, being 20-in. diameter and 6½-in. face.

An interlocking differential lock with which the tractor and its load may be operated in bad going or on slippery places.

A complete control board forming a brace between the top of the steering column and dash, and which embraces speedometer, oil-pressure gauge, ammeter, lighting switches, ignition switch and fuses. These are in an extremely handy location for the operator.

The oil pump (of the geared type) hangs from the upper half of the crank case, eliminating pipe connections inside and outside of the motor.

Automatically operated trycock when the cap of the filler is open and closed.

Unique jack shaft brakes with easy adjustment and renewal of shoes.

Automatic locking device for jack shaft brakes.

Ball bearing rocker arms for valve operation.

Restriction of the power beyond rated speed for heavy hauling without use of governor.

Power Plant

Beginning with the power plant, the motor has four cylinders, cast in pairs, 5-in. bore, 5½-in. stroke, and is so designed as to develop great horsepower, easy starting and quick acceleration up to approximately 1000 r.p.m., beyond which speed the power will rapidly diminish. This has been worked out on the theory that when running under full load speed will be limited by this design, and that when running without load the tractor may be driven at higher rate of speed without damage.

The valves are located in heads bolted to the cylinder proper without the use of valve cages.

The water circulation is taken through "U"-shaped castings bolted to the side, so that no water joint is made when the head is bolted to the cylinder. The Knox Motors Company retains the overhead valves, as has been their practice since 1901.

The motor is equipped with the Bijur starting and lighting system, and with Mea Magneto.

The motor is supported in front by a forged steel beam, and the two rear legs

The New Knox Tractor

This is a new model evolved by the Knox Motors Company and has many decided innovations in tractor construction, but a number of the "tried and found true" details have been retained

The carburetor, magneto, generator and starting motor are all carried high up on the engine, the lowest point of any of which is 31 in. from the ground. The tractor is thus able to pass through water of this depth without the water touching any of these instruments.

High-pressure forced-feed lubrication is used, the main lead being through a steel pipe cast within the crank case, and from this drilled holes communicate with the various bearings.

The pressure regulating device discharges excess oil over the timing gears in front. As said before, the oil pump hangs from the upper half complete, and a large screen, which entirely covers the pump and reaches up to the upper half of the case, is fastened to a bronze skeleton housing which is integral with a cap bolted to the lower half of the crank case. By removing six nuts the screen may be withdrawn for cleaning without disturbing any of the mechanism.

Starting is accomplished by sliding the starting motor gear into mesh with the gear cut on the flywheel. The same three-plate disc clutch, with cork inserts, is used as heretofore, except they are now equipping this tractor with their largest size.

The exhaust gases are taken into a large ribbed manifold and led forward, passing down in front of the motor, thence to the muffler. In this position the waste air, after passing through the radiator, helps to cool the exhaust. The muffler is hung in front of the front axle to get the cooling effect of the air as much as possible.

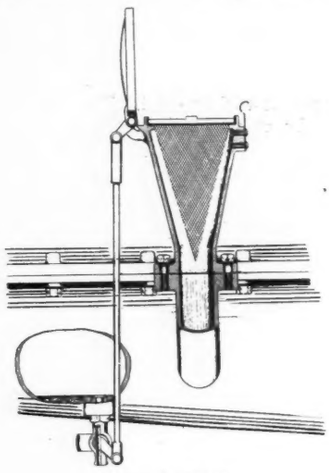
The motor is supported in front by a forged steel beam, and the two rear legs are bolted to the frame, making a three-point suspension. No sod pan is used under the motor, but in lieu of same, sheet steel webs are used between the crank case and the frame, and a sheet housing covers the flywheel and clutch. Ball-bearing rocker arms, operating the valves, are used, and are grease tight, eliminating grease cups in this connection.

Transmission

The transmission is of the selective type, three speeds forward and reverse, with center control, and is of extremely heavy construction. The interlocking differential lock is incorporated in the transmission, and is operated by a heel button in the floor at the driver's seat. Owing to the interlocking device the lock cannot be used unless the transmission gears are in the neutral position. This eliminates the trouble encountered heretofore in breakage of differential locks which, although of tremendous advantage, have not been used due to this breakage. The trouble has

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

been caused by using the lock when one wheel was spinning at a high rate of speed. With this new device the operator must bring the transmission gears to the neutral position, which immediately stops the spinning wheel, before he can engage the lock. After engagement any speed in the transmission may be used. Throughout large, double-row ball bearings are used, as shown in the illustration. All of the gears and shafts are of nickel steel, heat-treated.



Knox Oil Filler

Interconnecting device opens trycock at proper oil level height, preventing too much oil being put into crankcase.

The transmission control lever is located between the two seats at the driver's right hand, and the other controlling devices, as well as the steering gear, are located on the left side, making a left side drive, center control layout.

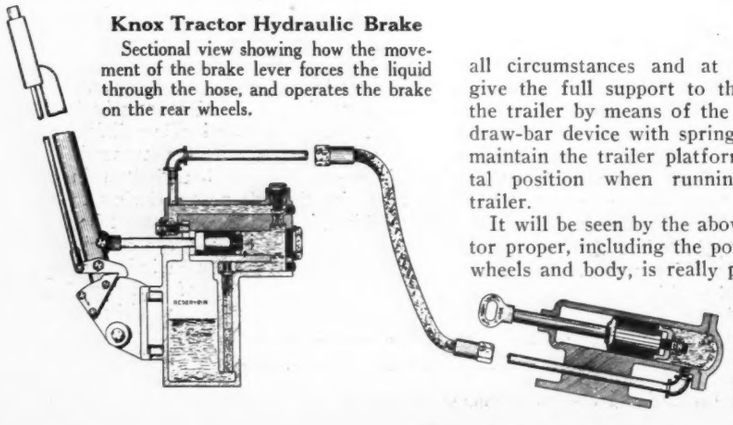
Brakes

The foot-brake pedal is automatically locked, when desirable, and operates on the jack shaft through cast-iron shoes against cast-steel drums 14-in. diameter, 4-in. face. These drums have a multitude of cooling ribs for the radiation of heat.

The hand brake, which is located between the two seats alongside the transmission control lever, operates the hydraulic pump bolted to the top of the transmission gear-shift housing, and this lever, by an ingenious arrangement, operates in the same manner as the ordinary hand brake, pulling back to apply the brake and easing forward to release it. The brakes are so designed that they will hold the tractor on a grade when abandoned by the driver, and it should be noted that the jack shaft brakes can also be locked, if desired.

Hydraulic cylinders are bolted to the strut rods and operate on the brake levers at the rear axle. The rear axle brakes are internally applied, and are 20-in. diameter and 6½-in. face steel spring bands lined with Raybestos.

The hydraulic brakes eliminate the necessity of brake rod adjustment when adjusting the driving chains.



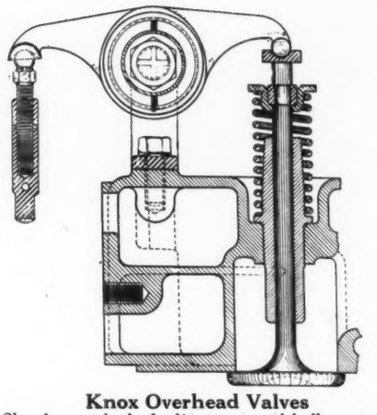
Knox Tractor Hydraulic Brake

Sectional view showing how the movement of the brake lever forces the liquid through the hose, and operates the brake on the rear wheels.

Other Details

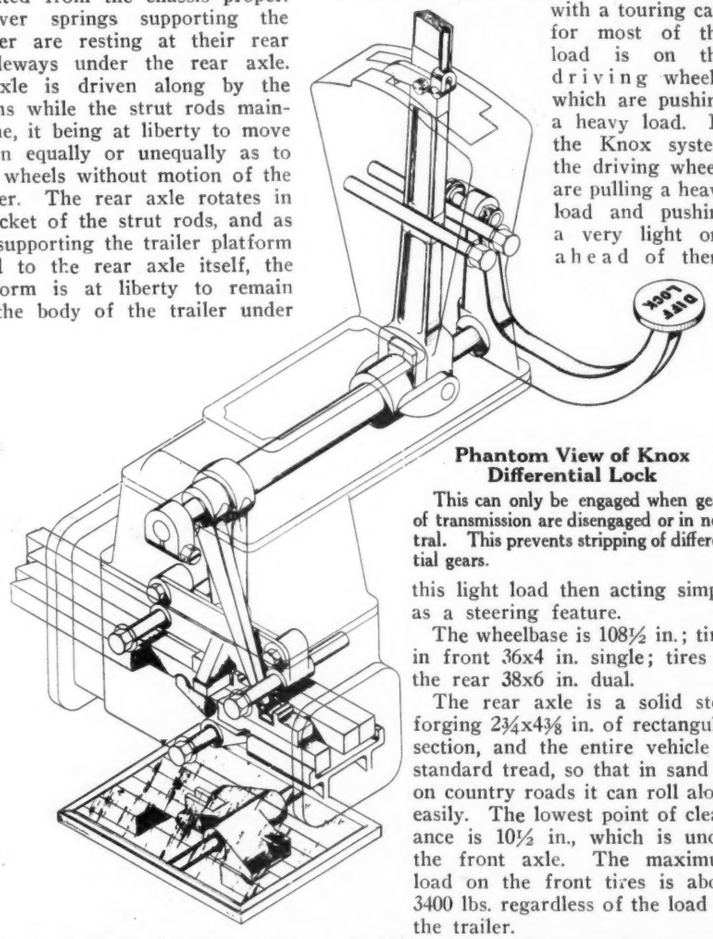
The Knox tractor principle is entirely different from what might be called a short wheelbase truck. The chassis proper is that portion which supports the transmission, motor, body, etc., and is carried on light springs (less than one-third as stiff as those on a five-ton truck) to absorb road vibration. It will be seen in the illustration that the frame does not extend to the rear axle, and that the rear axle is entirely isolated from the chassis proper. The cantilever springs supporting the chassis proper are resting at their rear ends in slideways under the rear axle. The rear axle is driven along by the driving chains while the strut rods maintain it in line, it being at liberty to move up and down equally or unequally as to either of its wheels without motion of the chassis proper. The rear axle rotates in the rear bracket of the strut rods, and as the springs supporting the trailer platform are fastened to the rear axle itself, the trailer platform is at liberty to remain parallel to the body of the trailer under all circumstances and at the same time give the full support to the front end of the trailer by means of the circle plate. A draw-bar device with springs is attached to maintain the trailer platform in a horizontal position when running without the trailer.

It will be seen by the above that the tractor proper, including the power plant, front wheels and body, is really pushed along by the rear axle through the distance rods or strut rods, thus the trailer really becomes the power-driven vehicle with a front-wheel drive. This also explains why this particular type of tractor will climb over obstructions which cannot be negotiated with a touring car, for most of the load is on the driving wheels, which are pushing a heavy load. In the Knox system the driving wheels are pulling a heavy load and pushing a very light one ahead of them, this light load then acting simply as a steering feature.



Knox Overhead Valves

Showing method of adjustment and ball contacts



Phantom View of Knox Differential Lock

This can only be engaged when gears of transmission are disengaged or in neutral. This prevents stripping of differential gears.

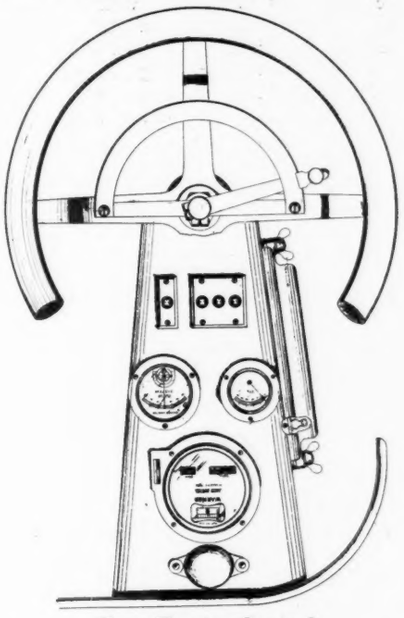
The wheelbase is 108½ in.; tires in front 36x4 in. single; tires in the rear 38x6 in. dual.

The rear axle is a solid steel forging 2¾x4⅜ in. of rectangular section, and the entire vehicle is standard tread, so that in sand or on country roads it can roll along easily. The lowest point of clearance is 10½ in., which is under the front axle. The maximum load on the front tires is about 3400 lbs. regardless of the load on the trailer.

At 1000 r.p.m. of the motor the gear will move the tractor as follows: High speed, 9.4 m.p.h.; second speed, 3.9 m.p.h.; low speed, 1.6 m.p.h. By changing the jack shaft sprockets and slight alterations the speed may be increased to 33 m.p.h. for use with fire apparatus.

Standard equipment includes the trailer platform, with its springs and circular plates. Electric starting and lighting with large searchlight, two heavy jacks for removing the trailer, fire extinguisher, speedometer, cab and side curtains and hand-operated mechanical horn. This, in addition to the standard tool and parts equipment.

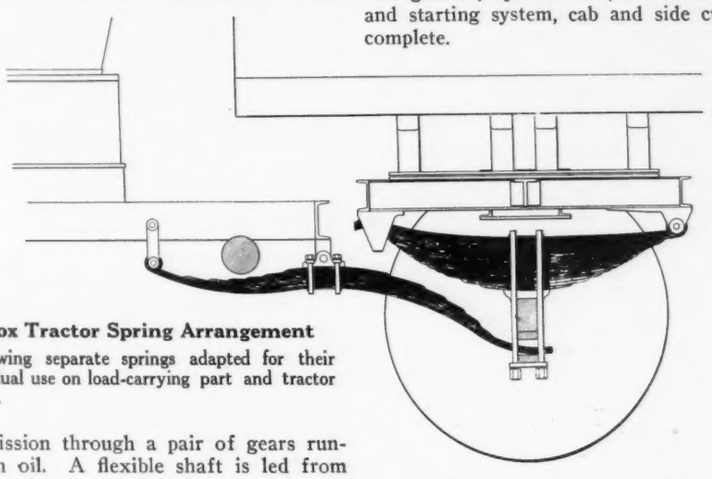
The weight of the complete tractor is about 8500 lbs., 3400 lbs. of which rest on the front tires under all conditions of load in the trailer.



Knox Tractor Control
Every instrument located right in front of the driver

All wiring is led through flexible metal conduits for protection. The battery is carried under one of the seats, and the tools under the other. The gasoline is carried in a 25-gal. tank on the right side, and is fed by vacuum system to the carburetor. Four gals. is carried in the automatic reserve supply.

The speedometer drive is taken from the forward end of the countershaft of the transmission through a pair of gears running in oil. A flexible shaft is led from here to the control board just under the steering wheel, where the speedometer is located.



Knox Tractor Spring Arrangement
Showing separate springs adapted for their individual use on load-carrying part and tractor proper.

The vehicle is practically standard tread; center to center of front wheels being 57⅜ in., and center to center of inside dual tires at the rear 55½ in. The vehicle will, therefore, follow the track on country roads.

The price of the tractor, including the following standard equipment, is $4500 f.o.b., Springfield, Mass. Standard equipment is: Trailer platform complete, two electric side lamps, one electric tail lamp, one large swinging searchlight, storage battery, two heavy jacks for removing trailer from tractor, mechanical horn, fire extinguisher, speedometer, electric lighting and starting system, cab and side curtains complete.

The machine will be marketed through the company's seven established branch offices, and a limited number of responsible dealers who are trained as transportation engineers and qualified to advise with purchasers regarding the most economical methods of moving their material.

The company's plans contemplate the establishment of a training school for transportation engineers that the public may have reliable data as to the many advantages of the motor vehicles, and especially the tractor method of hauling heavy loads.

Federal Has New Three and a Half Ton Worm-Driven Model

The Federal Motor Truck Company, Detroit, Mich., has announced a new model to be known as Model L. This truck will have a rated load capacity of 7000 lbs.

The standard length chassis weighs 6180 lbs. Its unusually sturdy construction is not merely a matter of appearance, then, but is real sturdiness, a fact which this weight, so well distributed, shows clearly.

The four-cylinder "L"-head motor, with a 4½-in. bore by 5½-in. stroke, is mounted on a sub-frame, which is a most desirable arrangement on a heavy truck. Forty h.p. is the motor rating. Eleven hundred and sixty r.p.m. is the maximum motor speed.

Waterproof high tension magneto with fixed spark, is used for ignition, Central jet, float feed-type carburetor is used.

The control of gas is by fixed spark and hand throttle.

The same system of motor lubrication —the constant level splash system—which has been a feature in Federals for years, is used in this three and a half ton model.

Clutch and Transmission

The radiator has an efficient cellular core with separate cast aluminum top and bottom tanks bolted on, forming a simple and exceedingly sturdy radiator, easily repaired in case of accident.

The clutch is of multiple disc construction; Raybestos and steel surfaces, entirely enclosed, and operated without oil. The forward end of the clutch shaft is carried by self-lubricating bushing. The throw-out construction allows no thrust nor wear on the rollers except while the clutch is actually held out.

The transmission is of selective sliding gear type, casing bolted to motor crank case, forming unit power, three speeds forward and one reverse.

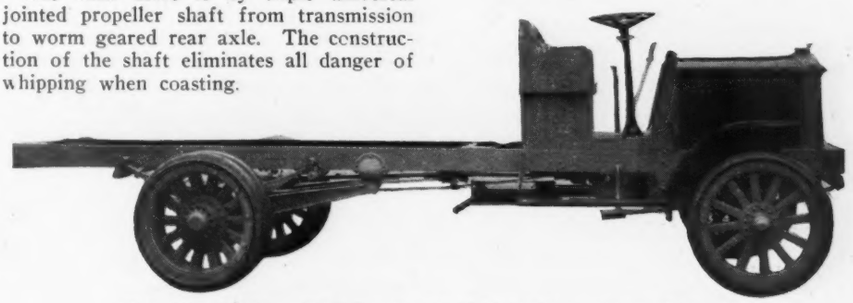
The Worm-Gear Drive

The final drive is by triple universal jointed propeller shaft from transmission to worm geared rear axle. The construction of the shaft eliminates all danger of whipping when coasting.

The massive worm gear rear axle is of full-floating construction, with heat-treated chrome nickel steel shafts. The shafts have integral driving flanges which bolt to the hubs and are splined to fit the differential.

Both hand and foot brakes are expanding shoes, in drums, on rear wheels. The shoes are faced with wire inserted asbestos fabric. The drums are 18 in. in diameter and 3½ in. wide.

A 6-in. channel frame is used—2⅛-in. flanges, web 7-16 in. thick; a substantial frame.



Side View of New Three and a Half Ton Worm-Drive Federal
Note radius rods and their fastenings. Wheels of wood, artillery type

The CCJ has most advertisers because it gives them biggest returns

The semi-elliptic springs are all of Vanadium steel—fronts are 45 in. long by 2½ in. wide; rears are 56 in. long by 3 in. wide.

Control in the Center

Strong steel radius rods connect the spherical seats of the axle casing with the side members of the frame. These radius rods relieve the springs of the driving thrust, and they control the axle position between the shackles.

The steering gear is of the worm and wheel type, adjustable for taking up wear. The 20-in. handwheel is located on the right side of the chassis with control in the center.

The gasoline tank is mounted on the chassis under the seat. It is made of seamless drawn steel and has a capacity of 28 gals.

The standard wheelbase is 146 in., with standard frame allowing 12 ft. 3 in. of loading space behind driver's seat. Special frames will be supplied at $50 net each, extra, allowing the following loading spaces: 10 ft., 14 ft. and 16 ft.

The seat is sheet steel, 46 in. wide, with upholstered back and removable cushions. Regular equipment includes seat, lamps, horn, tools, oil can and jack.

The Gear Ratios

The governor is automatically controlled by velocity of gas in intake manifold, which is entirely enclosed and sealed. The gear ratios are: High, 10.33 to 1; intermediate, 18 to 1; low, 34.7 to 1; reverse, 44.6 to 1. At maximum motor speed on high gear, one can travel at the rate of 12 m.p.h.

The Symbol System on the new three and a half ton is as follows: L-10 means three and a half ton worm 10 ft. behind driver's seat; L-12 means three and a half ton worm 12 ft. behind driver's seat; L-14 means three and a half ton worm 14 ft. behind driver's seat; L-16 means three and a half ton worm 16 ft. behind driver's seat.

The chassis price for this model is $2800 f.o.b. Detroit.

With its massive, sturdy yet graceful construction, it is already becoming popular, together with the one and a half ton chain and worm drive models, which are both selling at $1800.

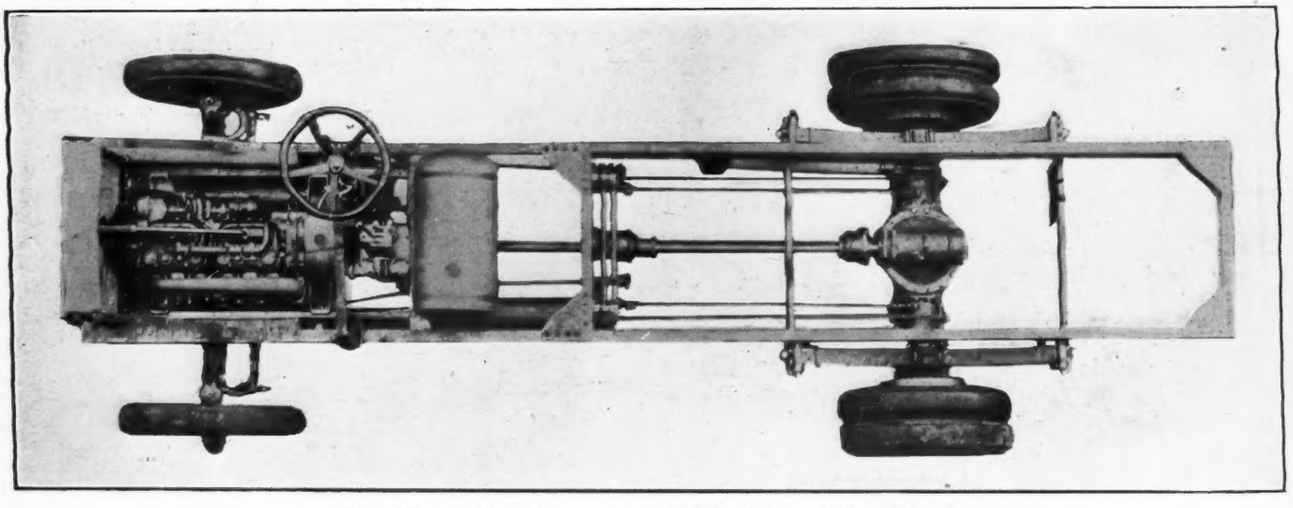
THE AUTOCAR COMPANY DEVELOPS NEW TYPE SIDE-DUMPING BODY

The success that the Autocar Company has been meeting in connection with the sale of its two-ton chassis and dumping bodies to road builders, contractors and similar industries, has brought about the development of a double-side dumping body to meet the requirements of those having need for a vehicle which will dump a portion or all of its load on either side of the vehicle.

The body consists of a structural iron understructure, and a metal-lined wood body, with two hinged gates on either side, which allow for the opening of the entire side of the body. The body is divided longitudinally into two compartments, and as it can be tipped either way, half of the load can be thrown on either side of the car, as shown in the illustration. The adjustable flare boards cause the load to be thrown sufficiently far away from the car to enable the car to drive between the two heaps of material with very little interference to the wheels. The body is elevated by hand, through a worm and gear reduction, extending longitudinally underneath the body, operating a chain which is connected to either side of the body. The operating shaft extends through both sides of the car, and the operator stands on the side away from the direction in which the load is to be dumped. The swinging sides are controlled by catches, operated from both sides of the car, so that the operator can release the gates, either standing on one side on which the load is to be dumped, or the opposite side. The body in the illustration is sufficiently large to hold 2 tons of soft coal, cinders or crushed stone.

New Autocar Side-Dumping Body

This is known as a side-dumping body, and can dump a portion or all of its load on either side. For details, see text



Plan View of New Three and a Half Ton Worm-Drive Federal

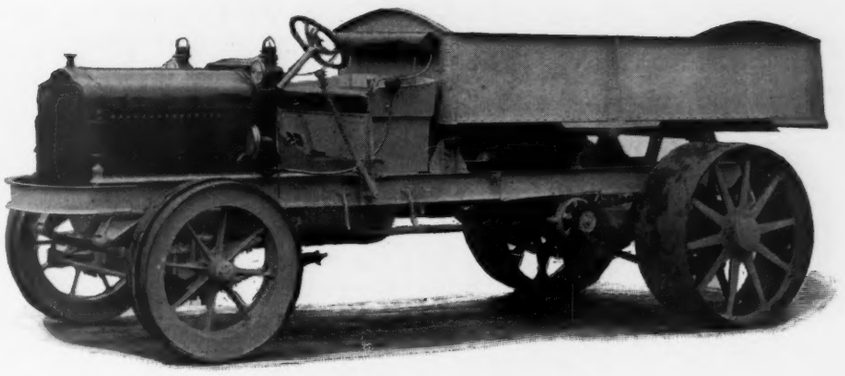
Showing sturdy rear axle, top worm drive, double universal joints and well-braced frame

The CCJ has most readers because it gives most information

WHITE MODEL ATC DUMPING TRUCK

The White Company, Cleveland, Ohio, is now building a five-ton dumping body model, known as ATC, the general specifications of which are the same as those of the TCD model previously described in these pages.

The dumping body mechanism consists of a screw and nut, placed out-of-the-way horizontally, along the frame of the truck, completely protected by a housing. The The power is supplied from the transmission, and the dumping mechanism is entirely controlled by a hand-lever beside the driver's seat. The dumping device takes up no room that should be utilized by the body, and is so simply and strongly built that it is scarcely possible for it to get out of order or break. The power is cut out automatically when the body reaches its extreme elevation, and again when it comes back to its normal position. The body can be elevated to an angle of 47°, insuring the discharge of the most obstinate materials, such as damp earth, wet ashes and asphalt, and moreover, the dumping operation is performed in 30 seconds. The hand-lever controls the application of the engine power, diverting it from the driving wheels to the dumping mechanism, which is operated through the regular transmission gears, giving the same four speeds forward and one reverse that are used in driving the truck. Moreover, the body can be held at any intermediate angle, and the truck driven forward or backward, making it possible to distribute the load as desired.



White Five-Ton Dumping Body

Truck fitted with tractor wheels for going through unimproved roads, gumbo, plowed fields, etc.

The standard bodies for the White Five-Ton Power Dumping Truck are built of sheet steel, capable of withstanding the hardest kind of usage, and are made in four different heights of sides.

The price of the truck complete, with standard dumping body, is $5200. Dumping bodies are also built in capacities of 1½ and 3 tons.

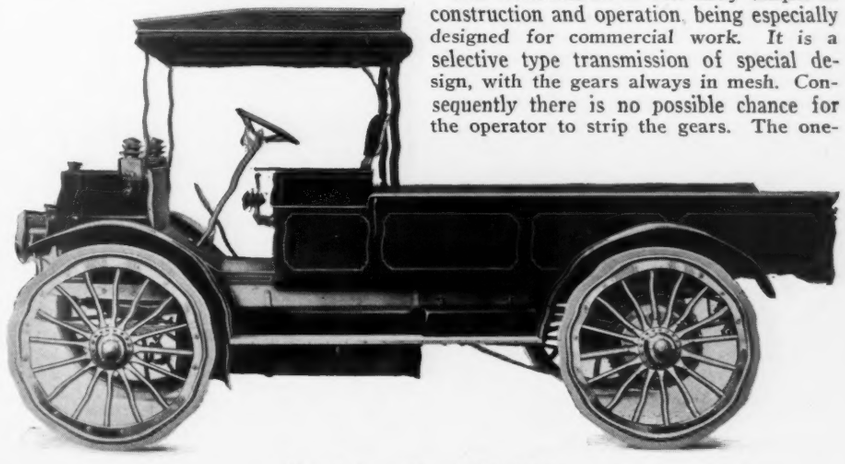
International Adds Fifteen Hundred Pound Model to Its Line

The well-known 1000-lb. IHC commercial car, built by the International Harvester Company of America, Harvester Building, Chicago, Ill., has been added with a 1500-lb. model of a general construction similar to the older model. It is furnished with flareboard and express bodies. The flareboard body is 44 in. wide, 90 in. long and 12 in. high, inside measurements, with 6 in. flareboards. The loading platform is 36 in. from the ground when light and 34 in., loaded.

The motor is of the L-head, water-cooled, two-cylinder opposed, four-cycle type. It is equipped with a sealed governor, which prevents the truck or motor being run at excessively high speeds, the gasoline supply being cut off when the truck reaches a speed of approximately 17 m.p.h. on high. This governor is a feature of distinct advantage where the truck falls into the hands of reckless drivers who are inclined to use it for joy riding. The counter-balanced crank shaft in this motor is of advantage in reducing vibration and is an aid in producing a smooth-running motor. Carburetor is 1¼ in. Holley.

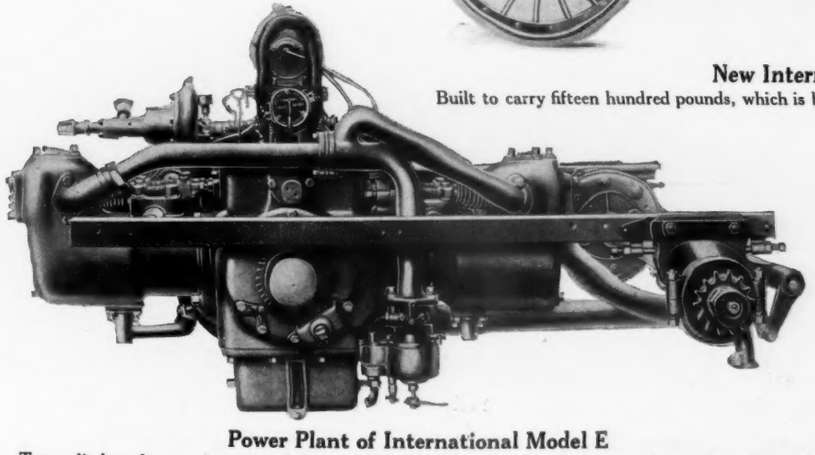
The transmission is extremely simple in construction and operation being especially designed for commercial work. It is a selective type transmission of special design, with the gears always in mesh. Consequently there is no possible chance for the operator to strip the gears. The one-lever control for both the transmission and clutch makes it impossible for the operator to shift from one speed to another without disengaging the clutch. The transmission has a full equipment of roller bearings, which makes a quiet-running and durable unit.

The new model is chain drive throughout. A noiseless chain is used to the countershaft. From the countershaft heavy 1 in. pitch chains are used to each rear wheel. The sprockets on the rear wheels consist of removable rings, which are easily removed and are renewed when worn. An improved type of countershaft is used, which



New International Model E

Built to carry fifteen hundred pounds, which is believed to be the size best suited to the average business



Power Plant of International Model E

Two cylinders, four cycle, opposed, water-cooled, 4½ x 5 in. Governor controls speed at 17 m.p.h.

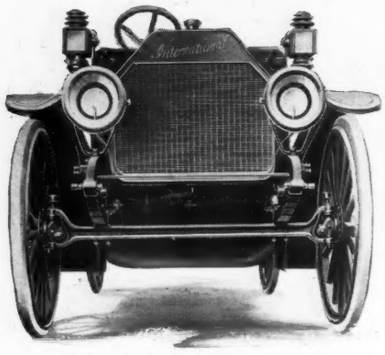
provides a large margin of safety both in regard to strength and wear. This countershaft is provided with roller bearings and self-aligning grease-tight cages. The brake drum for the service brake is located on the countershaft and is of large diameter and provides an effective and highly efficient service brake.

The wheels are of the artillery type, 38 in. in diameter, each wheel equipped with roller bearings and 2½ in. tires.

The I-beam front axle is 35-carbon steel, heat treated. The steering pivots are large size, hardened and ground, and work in hardened bushings provided with ample lubricating facilities. This type of axle in connection with elliptic springs, reinforced sill and artillery wheels with roller bearings, makes a high-grade construction.

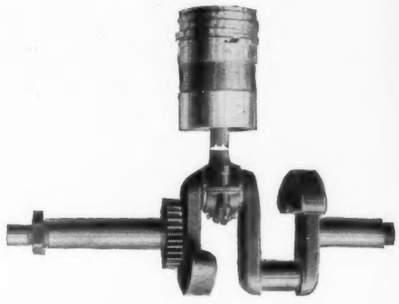
Wheelbase is 102 in. Steering is by right side pinion and sector gear. Brakes are a contracting band brake on differential operated by foot pedal and very powerful internal expanding emergency brakes on rear wheels operated by hand lever.

This model is furnished regularly with a seat having divided folding lazy-backs, fenders, magneto, two gas headlights and Prest-O-Lite gas tank, three oil lamps, horn and tools. On special order at additional cost the following will be furnished: non-skid chains, glass windshield, storage battery, combined speedometer and odometer and cab top for seat E-1. It will be furnished with 3 in. tires on rear wheels at additional cost.



Front View of International Model E

Note ample oiling facilities, semi-elliptic front springs and I-beam axle



Counterbalanced Crank Shaft of New International

This feature makes the opposed motor unusually free from vibration

THE PIERCE-ARROW HYDRAULIC HOIST

In this issue devoted to dump bodies, we wish to call attention to the hydraulic hoist utilized to operate the dump bodies of the Pierce-Arrow Motor Car Company, of Buffalo, N. Y. This hoist has been in use since 1912, in substantially the same form employed at present.

A test showing the dependability of the apparatus is seen in the use of this type of truck for the last year and a half by the McKelvey Hine Contracting Company, Youngstown, Ohio. This five-ton machine is in use 10 hours a day, dumping a load every 10 minues, having made some 30,000 dumps, with practically no attention to the hoisting equipment.

The hoist is mounted behind the driver's cab, control being by a lever on front of the cab seat, to throw the pump into operation, and the three-way valve, to raise, lower, or hold the body in a desired angle.

The chain sprocket on the transmission countershaft revolves on ball bearings. or rather that the chain sprocket is stationary, while the shaft revolves inside on ball bearings. The auxiliary power shaft alongside the transmission also revolves on ball bearings. The problem of lubricating plain bearings on motor trucks is very serious, as drivers will not pay the attention to this point that is necessary to obtain satisfactory results. A ball bearing is content with a minimum amount of care and attention, and was adopted for this reason.

The chain between the sprockets both in front of and behind the cab is a Whitney ¾-in.pitch, chain No. 203. No provision is made for adjusting for stretch, and none has been found necessary. The sprocket at the back of the driver's seat makes a maximum of 620 r.p.m, being prevented from going any faster by a governor on the motor. The pump itself turns at 800 r.p.m. The pump is of the rotary type, the gears, being each of 15 teeth, 5 d.p. and 2½ in. wide, mounted on 1-in. diameter shafts.

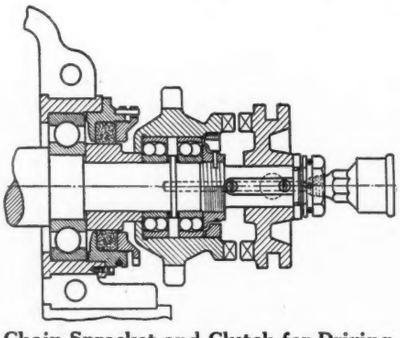
The hydraulic cylinder is made from weldless steel tubing and the end flanges are screwed on, and then a sealing of autogenously welded irons, run in a groove between the flange and tube. This prevents all possibility of leakage. The tubes are machined and gun-reamed to a bore of 5 in. The flanges are kept leaktight by a copper gasket at the joint with the head and base.

The piston has the usual cup leather. In some of the earlier hoists, grooves in the top of the cylinder were employed, so that when the piston reached the limit of its travel, the oil by—passed along these grooves. This was found to cut away the leather in time, and abandoned in favor of the method shown.

The piston rod is 1⅝-in. nickel steel, carrying at its upper end a crosshead on which run freely two sheaves over which the body cable passes. A third sheave is placed at right angles to these on the cylinder head. This sheave acts as a compensating device distributing the stress equally throughout the cable, and had the additional advantage that there are only two ends to the cable.

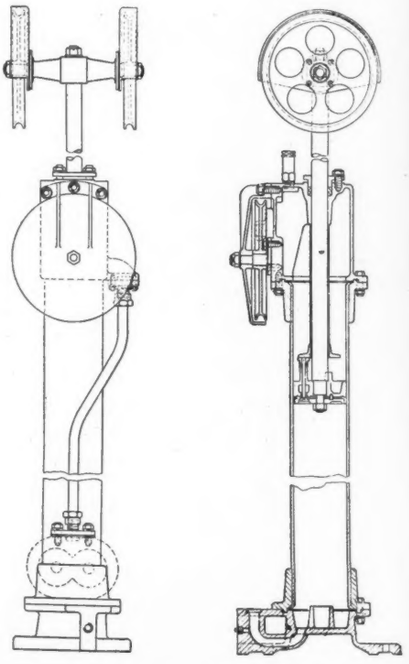
The ends of the cable are connected by yokes to substantial brackets on the front of the body. In operation, oil is drawn from the cylinder head through the three-way valve, through the pump and thence under pressure to the bottom of the piston. If it be desired to hold the body in any position, the valve is turned round, shutting off the intake pipe. If the body is to be lowered, the valve is turned round, so that the oil is by-passed round the pump from the lower part of the cylinder to the upper.

It is interesting to note that the pressure of oil required to lift a full five-ton load plus the body is over 400 lbs. per sq. in. and that the pump is working at the rate of 6 h.p. per min. in lifting the body up in 8 sec.



Chain Sprocket and Clutch for Driving Pierce-Arrow Hydraulic Hoist

This is mounted on the forward end of the transmission countershaft. The sprocket drives an auxiliary shaft by chain, another chain driving the pump, from the rear end of the auxiliary shaft.

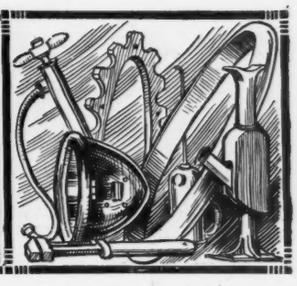


Section of Pierce-Arrow Hydraulic Hoist

The rotary pump is mounted on the base of the hoist cylinder, the head of the cylinder being used for the oil reservoir. The pump is driven by chains and shaft from the transmission countershaft. Three small valves in the piston are opened by a spacer, when the body has reached its limit of travel, the valves allowing the oil to by-pass into the reservoir.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

TRUCK ACCESSORIES AND APPLIANCES



THE DAY SECTIONAL EXTRA TREAD OR CASING

The Day Sectional Casing Company, 532 So. Canal Street, Chicago, Ill., is offering a new thing in outer protecting treads for pneumatic tires, called the Day Sectional Casing. It is made up of rubber sections which are placed across the tread of the tire and held together at the inner ends around the rim of the wheel by two steel rings between which the thickened ends of each section are clamped, the removable clamps being held in place by cotter pins.

The Day Sectional Protecting Tread or Casing

The rubber sections are held by steel rings at the rim

These steel rims are tightened by means of turn buckle screws which draw in the steel rings until the protecting casing or cover formed by the section is held securely in place. The sections are made of specially prepared rubber and fabric with a non-skid tread and are claimed to be very tough and durable. There is no steel, leather or other material used in the sections themselves, the only metal being in the retaining rings and clamps. It is claimed that these casings will stand exceptional wear because of the circulation of air between them, keeping the tires cool, and that each section may be replaced separately. The prices run from $10 each for the 30x3½ size to $24 for the 37x5 in. size. Single pads are sold at 35 cents each for 3½ in., 45 cents for 4 in., 55 cents for 4½ in. and 65 cents for 5 in.

NEW "NON-GRAN" BEARING BRONZE SET

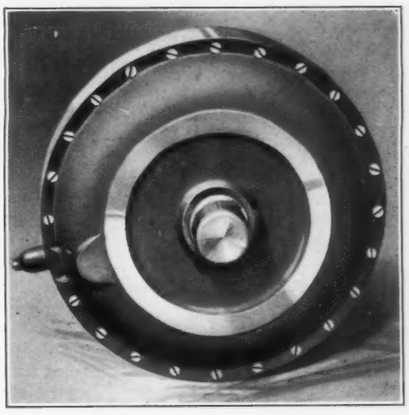
The American Bronze Company, of Berwyn, Pa., has just brought out a unique garage assortment of cored-bars, which consists of six graduated size bars of "Non-Gran" Bearing Bronze and is known as the Non-Gran "6-54" Assortment.

From these six "Non-Gran" bars it is said that a repair man can turn up any of the fifty-four standard size bushings and some hundred or more intermediate size bushings. This assortment takes care of every possible bushing need up to and including a shaft diameter of 1¼ in. The assortment weighs on an average of 21 lbs., which, at the net price of 47¼ cents per lb. to the garage trade makes a total investment for the garage man of about $9.90.

"STANDARD" AIR STARTER

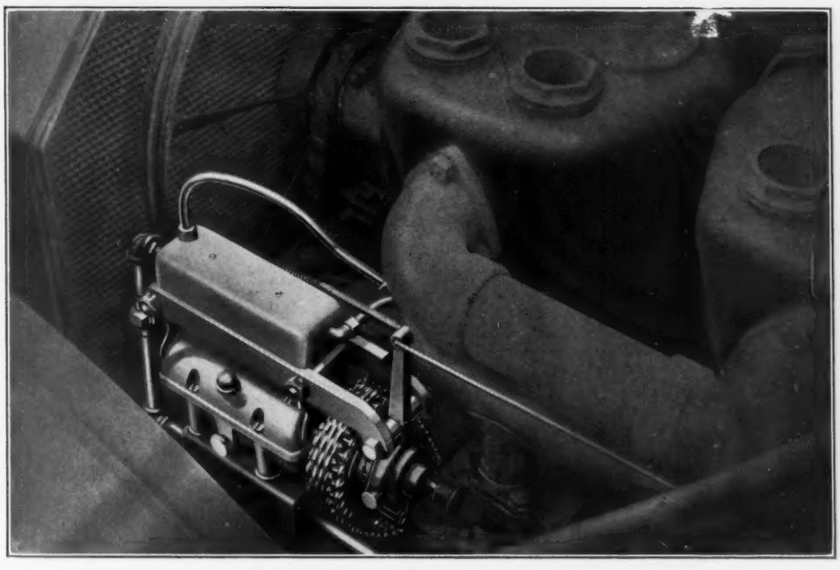
The Standard Appliance Company, Franklin, Pa., has designed an air starter for trucks consisting of three units, an air motor, a compressor and a tank, with the necessary piping, control valve and gage. The complete outfit weighs 85 lbs. The makers claim that the starter will spin the largest truck engine at the rate of 250 r.p.m. with a pressure of 25 lbs. of air. An air pressure of 100 lbs. is usually carried in the tank. The starting motor consists of but five assembled parts—two outside cases, piston and ring, double acting valve, and ratchet drive, there being but two moving parts to the starter—the piston and valve. The outside diameter of the starter motor is 10x3 in.

The air-compressor is water-jacketed. The outfit requires no attention except occasional lubrication.



Standard Air Motor or Starter

This company also furnishes a small truck lighting outfit which consists of a small generator sufficiently large to furnish the required current for one head and one tail light. A small battery is "floated on the line," suspended from the truck by a special device which eliminates all vibration. Where desired the compressor and generator is made as one unit, and this eliminates unnecessary attachments about the engine.



Standard Air Compressor Installed

This unit is driven from the crank shaft of the motor through silent chain, and is in operation only when it it necessary to charge the tank with more air for storage or reserve purposes

The CCJ leads in circulation, advertising and prestige

NEW FIFTH WHEEL OR CONNECTION FOR TRAILER AND TRACTORS

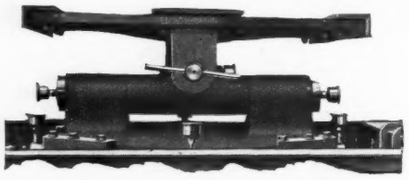
The International Motor Company, West End Avenue and 84th Street, New York City, offers a special form of "Fifth Wheel" for properly attaching a tractor to any kind of trailer. It consists of three main parts, a bottom steel ring, lower section and upper section.

The bottom steel ring is mounted on a platform placed in the chassis. The lower half of the universal connection is recessed in the steel ring in which it turns, and is held in place by four sets of shoulders. The top half of universal connection is permanently bolted to the trailer in such a manner as the conditions may require. The top and bottom half of the universal connection are fastened together by means of a pin or drawbar which can be inserted or removed at will. The lower half is free to turn in the bottom steel ring. The upper and lower parts are connected so as to allow perfectly free rocking movements of the upper section (that is up and down motion) and sideways. This action, in combination with the swivel motion in the bottom ring, gives full universal movement, so that the trailer may assume any position possible and accommodate itself to any inequality in the road, thereby relieving the tractor chassis from any twisting strain or other stress. On all ordinary construction when short trailers are to be used, as in contracting work, the "Fifth Wheel" is furnished as shown in the first cut. Both shafts of the universal connection and bottom steel ring are lubricated by means of grease cups provided at convenient points.

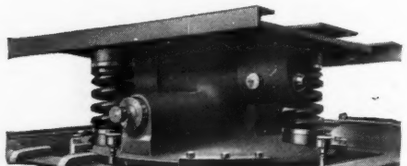
On ladder wagons, other fire department work and on long lumber trailers, it is necessary to stiffen up the universal connection by inserting springs between the bottom and top sections as shown in the second cut.

For contractors' work where one truck chassis is used for several trailer bodies, it is desirable to furnish in addition to the "Fifth Wheel" a quick demounting device which consists of two toothed plates. The bottom section, as shown in our third cut, is bolted directly to the top half of the universal connection, and the upper toothed plate is bolted in inverted position directly to the bottom of the trailer frame. This quick demounting device provides an instantaneous method of uncoupling the truck chassis from the trailer.

"Fifth Wheel" or universal connection, mounted on chassis, lists at $150; springs and mounting for fire department or other long trailers, $50; quick demounting device, two toothed plates and mounting, $50.



"Fifth Wheel" for Ordinary Construction
Used on short trailers, such as contractors' work

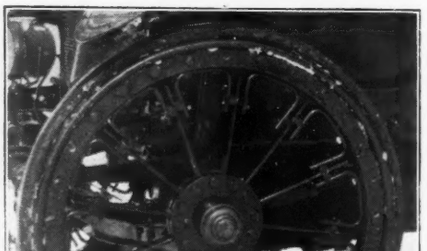


"Fifth Wheel" for Long Trailers
For use on ladder wagons, long-timber trucks, etc.

Quick Demounting Device for "Fifth Wheel"
Used where several trailers are handled by one tractor, facilitating detaching trailer from tractor.

CHICAGO SPRING WHEEL

Gray Bros. & Company, 321 South La Salle Street, Chicago, has recently gotten out a spring wheel in all sizes for trucks. This wheel is said to be very resilient. Being shod with solid tires all puncture troubles are thus eliminated. The parts consist of an ordinary hub, special side flanges, engaging straight flat tapered spring spokes which are in contact with rollers that roll upon U-shaped springs attached to the rim. The hub and spring spokes float in the rim, but the hub holds to the center except when the wheel hits a bump.

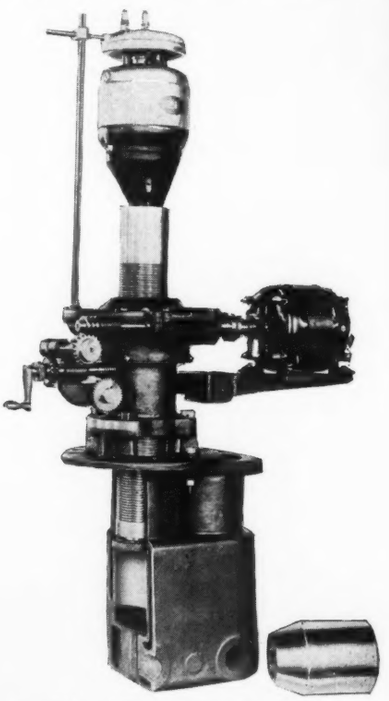


Chicago Spring Wheel

THE BOXILL AND BRUEL PORTABLE CYLINDER GRINDER

This device has been developed by Boxill & Bruel, 112 E. Fourth Street, Cincinnati, Ohio, to provide manufacturers, high-class repair shops, etc., with an efficient and inexpensive method of grinding cylinders. Operating current may be obtained from a light socket.

This little grinder is self-contained, and consists of a vertical bar with a circular rack integral with it. This is fed through a train of worms around and down at the same time by a horizontal motor. Inside of this bar is a sleeve which contains the grinding spindle, and this sleeve is eccentric with the main bar, which permits boring cylinders of different size. Flexibly coupled to the grinding spindle is a vertical motor, which turns the cutting wheel at high speed. The horizontal motor is 1-10 h.p. and the vertical 1-6 h.p. An unique method of attaching the grinder to the cylinder insures quick alignment. The graduation on top of the bar permits accurate and sensitive adjustment. The feed is entirely automatic—when set and started the machine does the rest.



Boxill and Bruel Portable Cylinder Grinder in Operation
One half of the cylinder is cut away to show grinding in detail

"Northern" Portable Air Plant and Pneumatic Jack

The large illustration shows a portable compressor outfit, which is notable for its extra heavy construction, large two-cylinder, double-opposed air compressor and electric motor. The tank is 10 x 36 in. A pressure of two hundred pounds is obtainable. The other illustration shows a small pneumatic jack, which is recommended for lifting heavy trucks where compressed air is available. Both are products of the Northern Engineering Works, Detroit, Mich.

The CCJ has most advertisers because it gives them biggest returns

Motor Truck Design and Construction Made Plain

Advantages and Disadvantages of Different Types Discussed

By C. T. SCHAEFER, Member Society Automobile Engineers

This is the fifteenth installment of a series of articles by this well-known writer, covering in a non-technical way the various constructions now current practice in commercial car design. These articles take up, in order, the general types of chassis, the advantages and disadvantages of each, illustrated by simple diagrams, and in logical order, motor construction, ignition, carburetion, cooling, lubrication, etc., until each part of the truck has been dealt with.

PART XV

THE FINAL DRIVE

[The length of this subject will necessitate its being continued through several issues.—Ed.]

FROM the transmission the power must be transmitted to another unit from which it is converted into useful work at the road wheels. In commercial car construction this is generally termed the final drive. There are a variety of methods of transmitting the power and in taking up the discussion of the final drive, the writer will attempt to cover this subject as clearly as possible and is offering illustrations of a number of different types in use at present. The general problem of the final drive resolves itself into the transmission of motion from one or more revolving shafts to driving wheels flexibly connected to the frame through axle and springs, and at the same time effecting a reduction in rotative speed between the driving shaft and rear wheels.

Chain Drive

During the past years the majority of commercial cars were equipped with what is known as the double side chain drive. However, this type of drive has its disadvantages, but will in all probability retain its popularity until something better is found. The principal objection to it is the attention required to obtain maximum efficiency. It is generally exposed and dirt soon finds its way into the numerous bearings, causing rapid wear. For a time, chain cases seemed to be the solution of the problem, but they are not satisfactory and most makers are experimenting with different types of shaft drives. This has resulted in the introduction of the bevel gear, double reduction, internal gear and worm gear rear axles.

In chain drive the power must be transmitted to a unit carrying the driving sprockets, the differential and in some cases a set of brakes. This unit is generally termed the jack shaft and may be built integral with the transmission or in a separate unit, mounted separately or bolted to the transmission. This jack shaft is similar to and performs the same functions as the bevel gear rear axle in pleasure cars, excepting, of course, that it does not carry the weight of the vehicle. For this purpose a dead rear axle is used, which has spindles upon which the wheels and their bearings are mounted. Various types of rear axles may be found in use at present, their section being either round, square, rectangular or I-beam. The jack shaft is usually equipped with one set of brakes, while the other set is mounted in the rear wheels. However, there seems to be a tendency lately to mount both sets of brakes in the rear wheels.

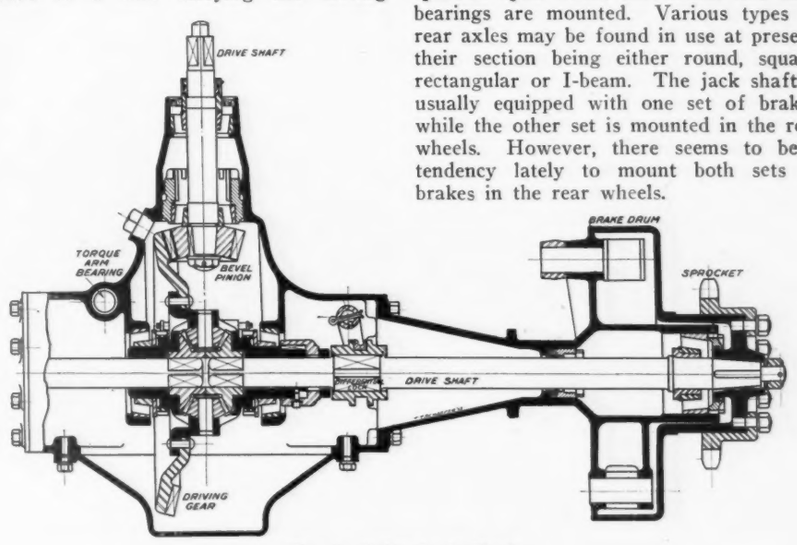


Fig. 2. Velie Jack Shaft

Also a separate unit, but differing from the Sheldon construction in having the transmission mounted on the subframe and the jack shaft on the main frame

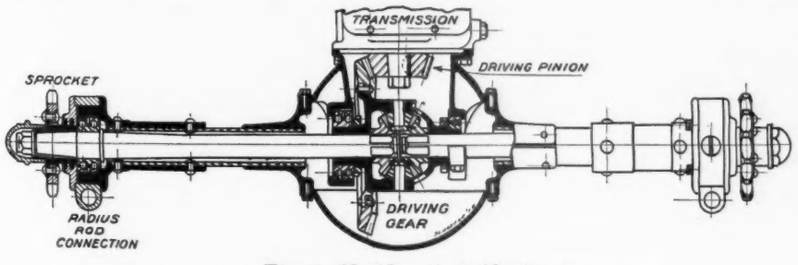


Fig. 1. Sheldon Jack Shaft

Furnished separate for bolting to any standard transmission

Some method must be provided to take up the driving thrust from the rear axle to the frame. For this purpose a radius rod is provided, which also takes up the brake pull, and the reaction due to chain pull, as well as allowing for adjusting the slack in the chain. These rods are generally of the full universal type, being pivoted on the jack shaft and the brake support or spindle of the rear axle. They are sometimes provided with large coil springs to take up abnormal shocks, when engaging the clutch or backing up to a curb.

The chain drive in reality is a double reduction through two units, one reduction being obtained through the bevel gears in the jack shaft, while the other is obtained

The CCJ has most readers because it gives most information

through the jack shaft and rear wheel sprockets.

Fig. 1 illustrates the jack shaft built by the Sheldon Axle and Spring Company, which is used on a number of commercial cars, being a separate unit so arranged that a standard transmission may be bolted to it. The differential is of the bevel gear type, while the working parts are mounted on ball bearings.

Fig. 2 depicts the Velie jack shaft which is a separate unit, the transmission being mounted on a sub-frame, while the jack shaft is mounted on the main frame. Like the Sheldon construction, the driving unit is so arranged that it may be removed through the inspection cover opening without removing the jack shaft unit from the chassis. The differential lock is also shown, mounted on the right side of the differential housing. The jack shaft is flexibly mounted on the frame, while a torque arm is used to hold it in alignment. The differential and drive shafts are mounted on roller bearings. Internal expanding brakes are provided. The outboard bearing for the sprocket is mounted as close as possible to the chain center, so as to overcome the high tension in the chain on low gear.

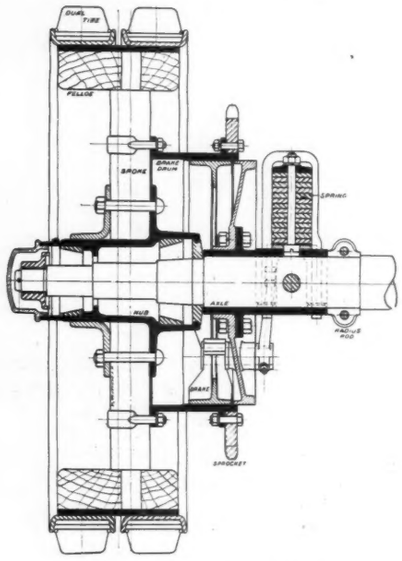


Fig. 3. Velie Rear Axle

Brake spider keyed to spring seat. Internal brakes are mounted inside of drum, to which driving sprockets are attached. Drum is clipped to wheel spokes.

In Fig. 3 is shown the Velie rear axle which is of round section, having a spring seat, which also carries the brake spider keyed to it by a large bolt. The spring is mounted above the axle and retained by spring clips. The radius rod is mounted inside of the spring and pivots on the rear axle spindle. Internal expanding brakes are mounted inside the brake drum, to which the driving sprockets are attached. This drum is attached to the spokes of the wood wheel by spoke clips, while the wheels are equipped with dual tires. Wheels have roller bearings.

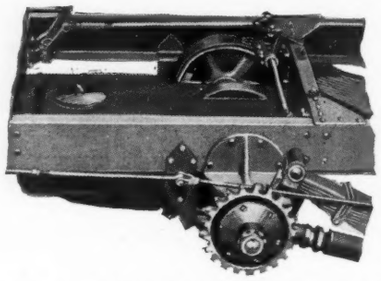


Fig. 5. Peerless Jack Shaft; Integral With Transmission

Fig. 4 illustrates the radius rod used on the Atterburg chain driven models. This rod is of the universal type, being pivoted and hinged to jack shaft at the forward end and hinged to the brake support at the rear end, which in turn is found to pivot on the rear axle spindle. An adjustment is provided at the forward end on which is mounted a heavy coil spring. The rod is constructed in two sections, so that the rear end may slide upon the forward end, the spring holding both ends in their positions. When the clutch is suddenly engaged or when backing up to a curb, this spring takes up the abnormal shock, by compressing and permitting the rear section to slide over the forward one. As soon as the force is removed the spring expands and returns the rear end to its proper position. This type of radius rod is also used on the Velie and Lewis commercial cars.

On the Peerless truck, the jack shaft is built integral with the transmission as shown in Fig. 5. It is similar to the constructions described above, excepting that one set of brakes is mounted on the jack shaft inside of the frame and anchored to the frame cross-member instead of to the housing proper. The shafts are not enclosed, but are mounted in anti-friction bearings attached to the frame. With this construction the brakes are better protected from mud and water. Construction of this type may also be found on several other cars.

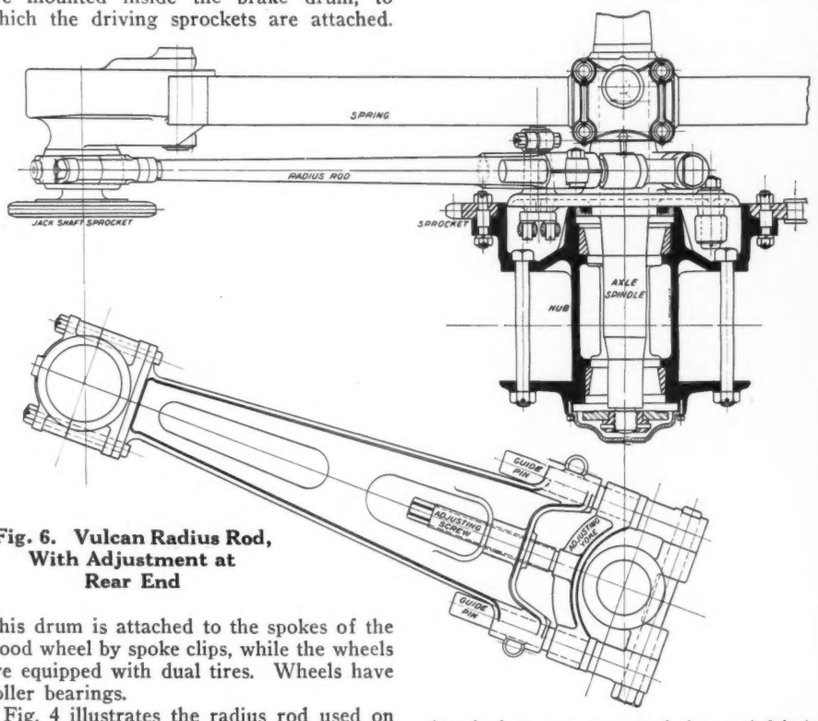


Fig. 6. Vulcan Radius Rod, With Adjustment at Rear End

The Vulcan radius rod and rear axle construction differ somewhat from the above in that the radius rod adjustment is placed at the rear instead of the customary place near the jack shaft sprocket. By referring to Fig. 6, it will be noted that the radius rod proper is similar to a marine engine connecting rod with caps bolted to the jack shaft end which fit over a spherical bearing. The rear end has three bosses, through which are inserted two guide pins and an adjusting screw. These guide pins are retained by clamping bolts, while the adjusting screw is attached to a yoke, through the outer ends of which the guide pins pass. A large bolt passes through the heads of these and through a bracket which pivots on

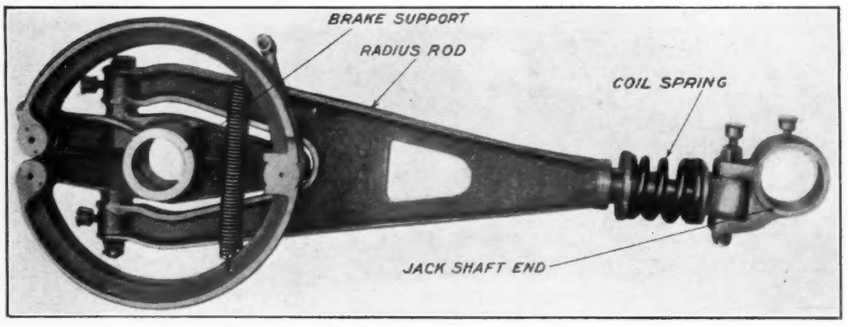


Fig. 4. Atterbury Radius Rod

The coil spring at the forward end takes care of unusual shocks

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the axle spindle, formed integral with the brake support. The hub and brake drum are cast integral and attached to the wheel by bolts and the wheels are mounted on roller bearings.

The Kelly three and a half ton jack shaft, Fig. 7, illustrates a pressed steel housing and a full floating construction which is quite accessible. The housing proper is pressed in two halves and welded together, while reinforcing tubes and flanges are used to strengthen it. To this pressed steel jack shaft housing is bolted a cast steel differential carrier or housing which carries the entire differential assembly and also the transmission. Provision is made for inspection of the differential assembly by removing the pressed steel cover plate from the back of the jack shaft housing. Each end of the differential housing carries a supporting roller bearing mounted in sleeves and held in place by the carrier and caps. An adjusting nut screws over each sleeve, where it is easily accessible and is locked by a small key on the carrier cap.

The outer end of the jack shaft housing terminates in ball sleeves, which are riveted to it. These sleeves provide universal movement for the entire unit when mounted in the chassis frame and also a universal movement for the forward end of the radius rod. The ball sleeves accommodate a roller bearing held in position against the shoulder of the drive shaft by a large lock nut properly secured by lock wires. A large adjusting nut, containing a felt washer screwed into the end of the ball sleeve, bears against the outer race of the bearing. Sprockets are bolted to flanges forged integral with the drive shafts and the bolts are equipped with hardened steel bushings. They afford equal distribution of the shearing strains on the bolts, due to the drive of the truck.

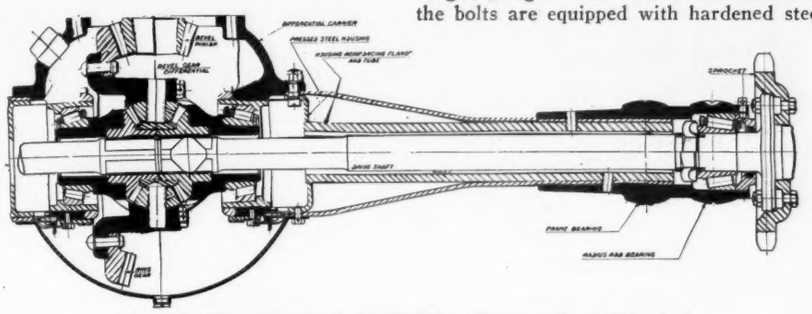


Fig. 7. Floating Jack Shaft With Pressed-Steel Housing
Ball sleeves on the ends of the housing provide universal movement for the jack shaft and the forward end of the radius rod

Fig. 8 illustrates the radius rod and double rear wheel brakes of the Kelly trucks. The radius rod proper is a drop forging and pivots from the brake spider. The chain adjustment is incorporated at the front end by adjusting screws. The rear axle is of I-beam section with integral spring pads.

The G M C one, one and a quarter and two-ton models have similar constructions excepting for size, which varies on the different capacities. This is illustrated in Fig. 9, showing the two-ton construction. The rear axle is of rectangular section and has a long spindle upon which the spring seats, brake spider to which the radius rod body is riveted and the wheels are mounted. The hub and brake drum for the internal brake are formed integral, while a separate brake drum is attached to the wheel spokes for the external brake, both sets of brakes being mounted in wheels operating on separate drums. The radius rod has the brake shaft bearings riveted to it, so that all brake reactions are taken on the radius rod. This radius rod is divided into a front and rear part, each having a large threaded boss to receive the adjusting screw. This screw has right and left hand threads and is locked by lock nuts. The front end of the rod is divided on the jack shaft center and is provided with a spherical surface to give universal movement.

(*To be continued in the April issue.*)

Fig. 8. Kelly Radius Rod Brake and Rear Axle Construction

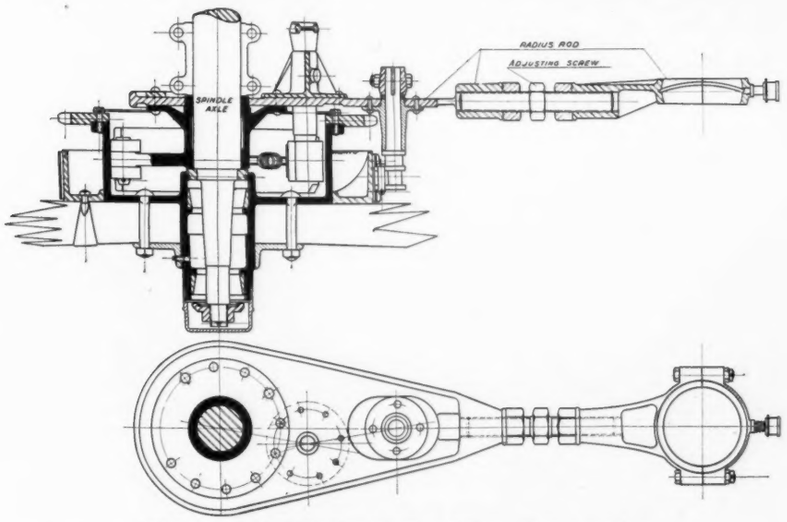


Fig. 9. G M C Radius Rod and Rear Construction
Adjusting screw is between front and rear halves of the radius rod. Brake shaft bearings are attached to the radius rod, so that it takes all braking strains

ARMORED MOTOR CAR AT PANAMA-PACIFIC EXPOSITION

Considerable interest attaches itself to the display by the United States government of the Jeffery Quad truck with the armored body, on which is mounted a rapid fire gun, at the San Francisco Exposition.

This is the only armored truck exhibited by the United States government and is a duplicate in many ways of the Jeffery Quad trucks which have been used by European countries during the war.

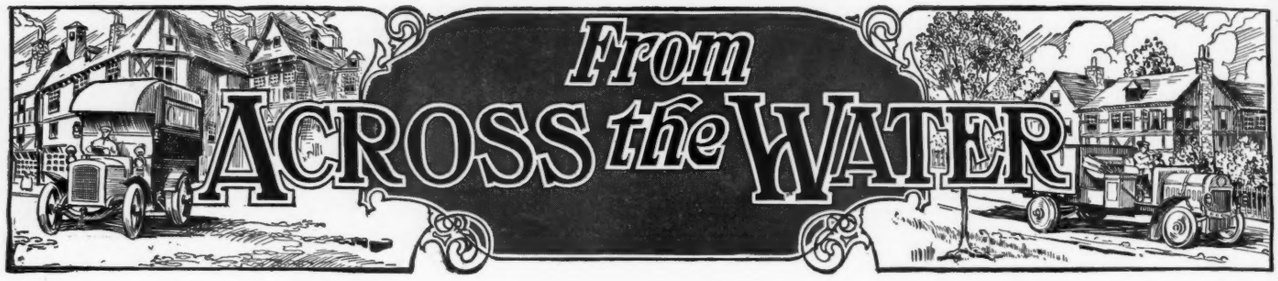
The Jeffery Quad was selected by the United States government after exhaustive tests had been carried out in the vicinity of Kenosha, Wis., where the Jeffery is manufactured. These tests included driving through mud that was over the hubs, plowing through freshly tilled ground, climbing a 35 degree grade.

Martin-Forsburg Teaming Company, Chicago, Ill., has incorporated with a capitalization of $25,000 to conduct an auto trucking business.

Pacific Motor Coach Company, Riverside, Cal., which operated a motor 'bus line from Los Angeles to Venice, Cal., has filed a petition in bankruptcy.

Clifton Automobile & Storage Company, New York City, has incorporated with a capital of $6000 to conduct a transfer and express business. Walter L. Scott, Stapleton, N. Y., *et al.,* incorporators.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?



French and English Subsidy Requirements for Commercial Cars

From Data Furnished by Our Foreign Correspondent

THE governments of various centers of the world have, at one time or another, deemed it advisable to assist certain industries financially for the reason that these particular industries may in turn serve the country itself in one way or another, and particularly in time of war.

In Europe, the outbreak of war having been expected for a long time, all provisions have been carefully planned in case of hostilities. What we particularly want to call attention to is the subvention or subsidizing of commercial cars for war purposes.

For several years past the countries now at war have forseen the utility and necessity of commercial cars for transporting food, arms, ammunition, airships, baggage, and even the troops themselves. It would, of course, involve the outlay of an enormous sum of money for the governments to purchase outright a sufficient number of vehicles, and then, too, these vehicles would remain idle until the outbreak of war. The conclusion reached was, that all owners of commercial cars which conformed to certain requirements, could register their cars under the subvention scheme, keep on using them for their own needs, and receive a regular stated subsidy or cash payment; but in case of war the vehicles were to be surrendered to the government upon call, a previously agreed price being paid for the vehicle. By this means many firms could, by employing vehicles of a certain type, receive substantial bounties from the government without giving up anything, except in case of war, and even then they lost nothing, being paid for the vehicle.

The governments wisely decided that, in order to operate thousands of commercial cars in wartimes, it would be highly desirable that these vehicles be fitted with parts that were interchangeable between vehicles, even if they were of different makes.

To this end the several governments have promulgated sets of subvention specifications to which all subsidized cars must conform. It will, of course, be understood that American trucks would not be eligible to receive the subvention, but the shortage of commercial cars abroad has let the bars down, and American trucks have been bought outright in enormous quantities since the war started.

It is our purpose here to give, in a general way, the subvention requirements of England and France, so that our readers may see which American cars would be preferred by these governments. We give only the leading features of the requirements, as the specifications are long and go into minute detail. We have all these specifications on file, however, and will be pleased to give details to any interested subscribers.

SUBSIDY SPECIFICATIONS.

	British	French
Capacity	Type A—3 tons Type B—1½ tons	Trucks—4408 lbs. Colonial Trucks—3306 lbs. 4 wheel drives—3306 lbs. (carrying capacity not including load on trailer).
Body Types	Detachable sides 2 ft. high.	Platform with box and cover.
Tires	Type A— Rear, 1050 x 120 m. m. dual. Front, 900 x 120 m. m. single. Type B— Rear, 1030 x 100 m. m. dual. Front, 870 x 100 m. m. single. Vide Note 1.	770 - 1000 m. m. diameter (30 - 40 in.). 90 - 180 m. m. width—single (3½ - 7 in.). 205-325 m. m. width—dual (4-12 in.). Tires must be solid. No pneumatic, hollow or block tires accepted.
Wheels	To be of steel: 881.6 m. m. dia. for 1030 and 1050 m. m. tires, and 719.8 m. m. for 870 and 900 m. m. tires.	
Engines	Type A— 4 Cylinders. Minimum bore, 4½ in. Minimum H. P. (R. A. C.), 30. Type B— 4 Cylinders. Minimum bore, 4 in. Minimum H. P. (R. A. C.), 24.8. Cylinders cast in pairs. Mechanically operated valves. Enclosed valve stems. Easy inspection. Engines under bonnet. Vide Note 2. Must have governors. Pump operated cooling system (no thermal system).	4 Cylinders.
Ignition	High tension magneto. Shaft center 50 m. m. high. Vide Note 3.	High tension magneto. Shaft center 45 m. m. high. Vide Note 3.
Radiators	Must be above frame. Two outlet connections. No honeycomb-type accepted. To be protected by bar.	
Lubrication	Positive driven pump. Oil capacity for 200 miles.	
Transmission	4 speeds forward and reverse. Low gear, about 5:1 to high.	4 speeds forward and reverse.
Final Drive	Shaft & bevel gear. Vide Notes 4 and 5. Drive must not be through springs.	
Brakes	Brake lever push to set. Vide Note 6. Foot brake to operate on propeller shaft. Foot brakes operating on rear wheels not accepted. Either brake independently must hold vehicle on grade of 1 in 5.	Either brake alone must be able to stop vehicle within 50 meters on 12 per cent. grade.
Towing Hooks	2 fitted front and 2 rear.	2 fitted front and 2 rear.
Wheelbase	Type A— Not less than 156 in. Type B— Not less than 126 in.	
Sprags	2 independent sprag bars on rear axle operated by handle at driver's seat.	Double sprag required.
Fuel and Water Capacity	30 gal. fuel tank.	Fuel for 200 kilometers (125 miles). Water for 200 kilometers (125 miles).
Performance	Gasoline consumption not greater than 1 gal. per 40 ton miles. Vide Note 7. Engines must develop at least their R. A. C. rating. Must be able to climb grade of 1 in 6 fully loaded.	Engines must operate with gasoline, alcohol or benzol. Fuel consumption per ton-kilometer must not exceed 6 centiliters (any kind of fuel). Lubricants must not exceed 5 grammes per ton-kilometer. Must be able to tow another loaded car on 8 per cent. grade.

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In General

It is to be noted that the British specifications give sizes, threads, dimensions, etc., for nearly every part of the vehicle, so that none but a specially built car could possibly fulfill the requirements. The French specifications, on the other hand, do not hold closely to sizes, but, with the exception of the main parts, allow wide variations, and place more stress on performance. In both sets of specifications a substantial list of tools and spare parts are required to be carried, the British set even specifying a spare magneto.

NOTES

1. All American cars sold to England and France must be fitted with British size rims to take British size tires.
2. "Vehicles with engines under the driver's seat will not be accepted."
3. American S. A. E. standard shaft height for magnetos is 45 m. m. (1.771 in.).
4. Chain drive to rear wheels not accepted.
5. Since these specifications were given out, worm drives have passed subvention requirements, and chain driven cars are also being used, but only because shaft-driven cars could not be secured. If their performance is good, the ban may be taken off. The principal objection to chain driven cars has been on account of the pavé roads which drop off from the roadbed some 8 or 10 in. to the gutter. In most cases when the rear wheel tires slip off this roadway, the sprockets become damaged from contact with the roadbed. Ropes wound around the axles to pull out of mud are also impractical on chain drives owing to the liability of the ropes becoming tangled in the chains.
6. Nearly all American emergency brake levers pull to set.
7. The British imperial gallon is equal to 1.20032 United States gallons, therefore the fuel consumption expressed in United States gallons would be "not greater than 1 gal. per 33.3244 ton miles."

JOTTINGS FROM THE WESTERN WAR FRONT

BOTH French and British motor factories are working overtime. The British as a rule are practically fully staffed, the French working with about 75 per cent. of their staff. The pleasure car factories are often at work on war material; while the commercial works are turning transport automobiles out as fast as they can.

American Trucks in Full Work at the Front

At the time of writing the delivery of the trucks that France has ordered from America is in full swing, and the American vehicle is making itself practically felt in the field.

With the roads getting worse and worse under climatic and campaign conditions the very heavy truck is going more and more out of favor with army authorities. In this matter the Germans have not been happy in their choice, for though their subvention requirements were avowedly framed to produce a type of vehicle suited to the French roads, they have on many occasions proved too heavy, especially where extemporized bridges were concerned. Many of their own pontoons have been designed to carry their subsidized trucks, but pontoons are not always available, and a small temporary bridge may offer a very different proposition.

What a boon a power engine starter would be to many of the motor truck drivers at the front now that the cold weather has come on. Even those who have tried to swing a big 40 h.p. truck engine only when warm, can hardly imagine what it is like when frozen up. Years ago, in the early days of the commercial car movement in Great Britain, some of the biggest omnibus engines were so refractory in this respect that only one man in a certain garage was reputed to be able to start the engine of a certain make of car, for which fact he got the sobriquet of "Strong Jack." The slide valve engines give the greatest difficulty in this direction, owing to the large sliding surfaces that are exposed to the action of congealing oil.

German Observation Truck

The observation truck, which the German army has been using in large numbers is a product of the war. It carries an extending ladder very similar to that of a fire escape, and by engine power this ladder, carrying an observer with it, can be very rapidly raised to a height of some 30 ft. above the ground.

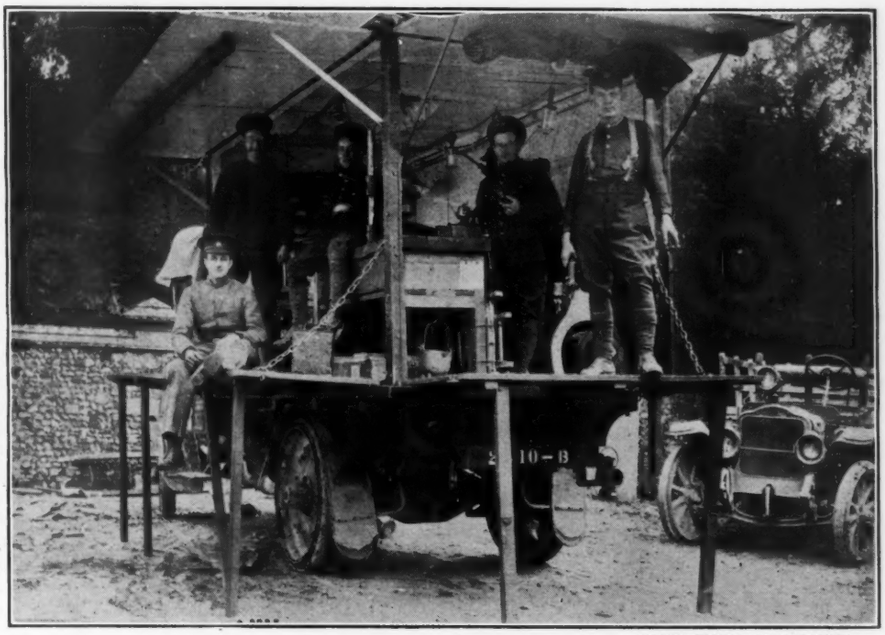
The uses of the motor truck are becoming more and more numerous: it is showing itself far more versatile than its best friends had dared to hope. Its latest rôles are as traveling surgical operation theatre, as traveling X-ray institutes, and as bacteriological laboratories: vehicles for each of these purposes have been constructed for the western Allies, and others to the writer's design are now under construction.

Bigger Ambulances?

In ambulance work too there are signs of the same tendency. Hitherto for field ambulances the chasses of ordinary pleasure cars have been utilized, but the feeling is growing more and more that something of larger capacity is wanted, and at the same time something that will afford more elaborate immediate care and attention to the wounded. Consequently certain departments of the army are inclining more and more to the bigger solid tired machine—something about the size of the 3000-lb. van chassis. It is also felt in some quarters that in other respects the pleasure car chassis is not altogether suited for ambulance work, for with the ordinary arrangement of chassis the 8 ft. length of space required for stretchers either involves undue overhang at the back, or necessitates a car of unusually long wheelbase: indeed there are only about six different chasses that can take a four-stretcher body with not more than the stipulated maximum of 2 ft. 9 in. at the back. The fact is that the driver's seat takes up the room that ought to be occupied by the stretchers, and it is pretty certain that, if ever a special chassis is produced for light or small capacity ambulance work, the driver's seat will be placed over the engine as in the design of certain taxi-cabs of the early days.

From time to time the Germans have undoubtedly been very hard pressed for supplies of gasoline. From time to time equally they have got out of the difficulty, but generally speaking all their solutions of the problem have been either temporary or partial. Once more they are reported to be obtaining supplies from Galicia *via* Austria. There are, however, very contradictory reports on this, for at the same time it is stated that the supply of gasoline in Austria-Hungary is so diminished that the military authorites have confiscated the entire output and forbidden refiners to supply the trade, while the stocks in the hands of civil owners are almost exhausted.

But whatever the truth of these reports, it is certain that they are economizing their gasoline in every possible way, and that many of the cars in Germany are now being run on kerosene.



INTERNATIONAL NEWS SERVICE

Canadian Traveling Work Shop

This car shows the compact arrangement of the field work shops now accompanying the Canadian supply column. The car is shown being overhauled before leaving Salisbury, for the front. It further illustrates the important part which trucks are playing in all of the armies now at the front.

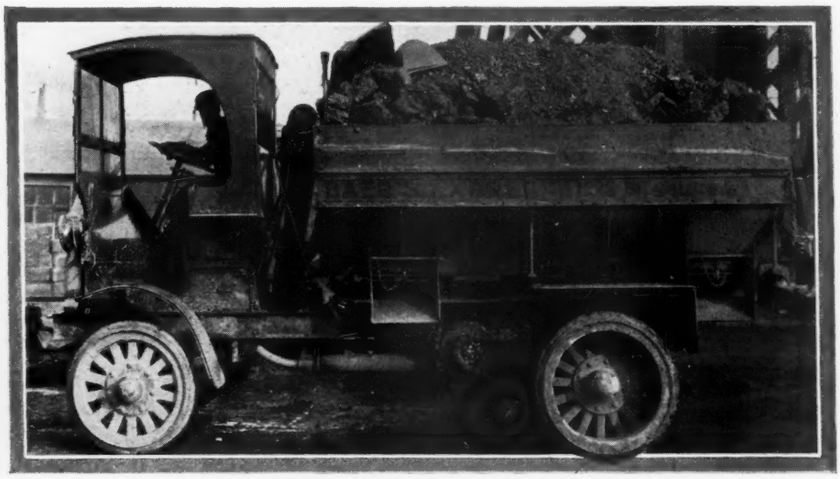
The CCJ has most advertisers because it gives them biggest returns

DUMPING BODY EXTENSIVELY USED IN COAL DELIVERY

(*Continued from page 16*)

The United Fuel & Supply Company, of Detroit, Mich., now one of the largest owners of motor equipment, were at one time the largest owners of horse equipment in the State of Michigan. In October, 1913, the officials of this company visited the plants of well-known truck makers, and purchased a few Pierce-Arrows. Careful records of comparative costs were kept, which included the whole cost of operation, and also percentage of idle time. This resulted in such a favorable showing that twenty more trucks of the same make were immediately ordered. Practically all of these are dump-body types, nearly all of them using hydraulic hoists. They are used not only for hauling coal and coke, but sand, gravel, stone, lumber, cement, roofing, white tile, brick, etc. The materials for the new Statler Hotel, Detroit, and Athletic Association building, and other large buildings were hauled entirely by motor trucks.

W. M. Steele trucks, Worcester, Mass., are supplied with a hand elevated dump body, one man being able to dump a capacity load of 3½ tons in less than 1 minute. This is in connection with coal delivery. The dump can also be had with small electric motor using a double throw switch for raising and lowering the body, current being supplied from a storage battery. An accompanying illustration shows a close view of the hand-dumping mechanism, which is of the vertical screw type, bevel gear operated. One of these trucks is used in coal delivery by a company that do all the rest of their hauling by horses, this being the only truck. Naturally, it is given all the long and hard hauls. From the 1st of April, 1914, until February 1, 1915, the truck handled 4954 tons, traveled 6494 miles in 1417 trips, averaging 3½ tons to the load, the average trip being 4½ miles. The cost of maintenance and renewals during this time was $285. The performance of this truck has caused the firm to decide upon a gradually increasing motor equipment, believing that power is cheaper than horse.



A Novel Coal Delivery Body
To facilitate delivery of coal this body is fitted with two chutes, one at the rear and one at the front

TRUCKS USED BY DETROIT DEPARTMENT OF PUBLIC WORKS EFFECT GREAT SAVING

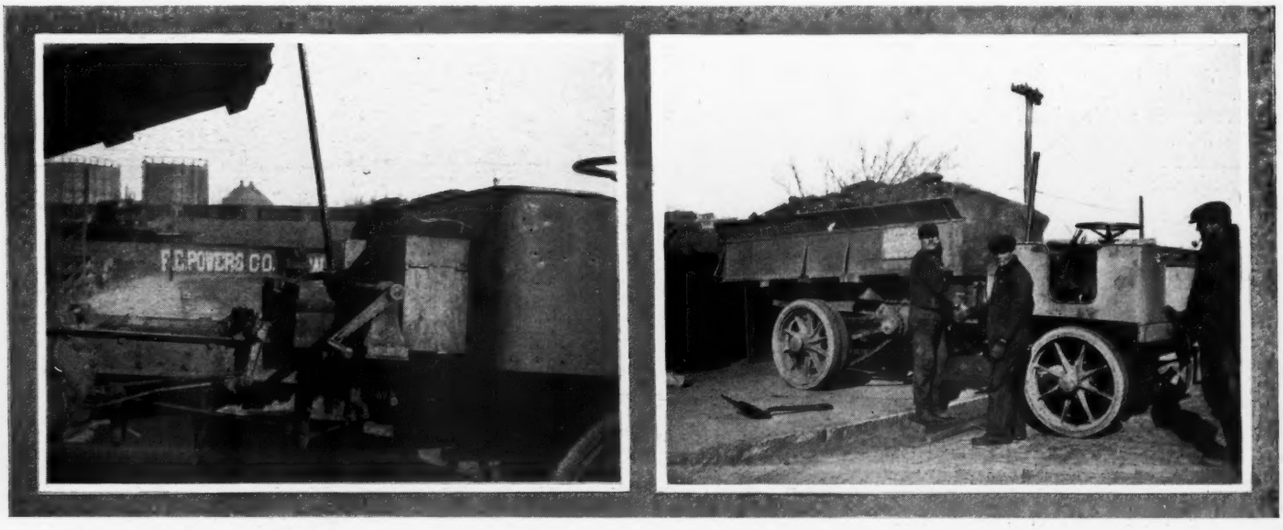
An interesting illustration of what motor trucks are accomplishing in certain lines of activity is provided by the Department of Public Works, of Detroit, Mich., which uses three five-ton GMC and two six-ton Packard trucks, equipped with dump bodies, for hauling asphalt and binder for paving purposes. Inspector Clarence A. Proctor asserts that, as compared with horses, the trucks are a five-to-one proposition, and backs that statement with figures showing the season's work. In making this comparison a single day will suffice, these conditions being typical.

July 30th, last, five trucks each made six round-trips on a 5-mile haul, and carried in the aggregate 182 tons of top and binder, an average of a little more than 3 tons to the load. Wagons used for the same purpose have a capacity of 3.5 tons. The 182 tons equalled fifty-two wagon loads, or the work of twenty-six teams, it being impossible for horses to make more than two round-trips daily for that distance. This meant that one truck was doing the work of a little more than five teams.

Although this is by no means the longest haul that is made, it is of sufficient length to place the horse at a very serious disadvantage. For the purpose of comparison let it be assumed that the distance traversed was such that the truck could deliver five loads, and horses three loads. The former would carry 30 tons of asphalt, and the latter 10½, or approximately, three to one.

Now let us see how the cost of delivery averages under these latter conditions. The city owns its dump wagons, but hires teams and drivers by the day, paying $5.50 for 10 hours. Allowing 50 cents for depreciation on the wagon, a very low figure, the total expense is $6 per day, or 57 cents per ton.

Each truck averages 20 gals. of gasoline and a gallon of lubricating oil daily; at current prices, a total of $2.40. Drivers are paid $3.33 per day. Twenty-five per



Steel Truck Fitted With Hand Cranking and Lifting Screw Demonstrates Economy of Motor Haulage
This truck has been in service and its work compared with horse hauling by the owners. Its economy has decided them in favor of putting on additional trucks. Capacity load can be raised and dumped in one minute by one man by the hand cranking and lifting screw

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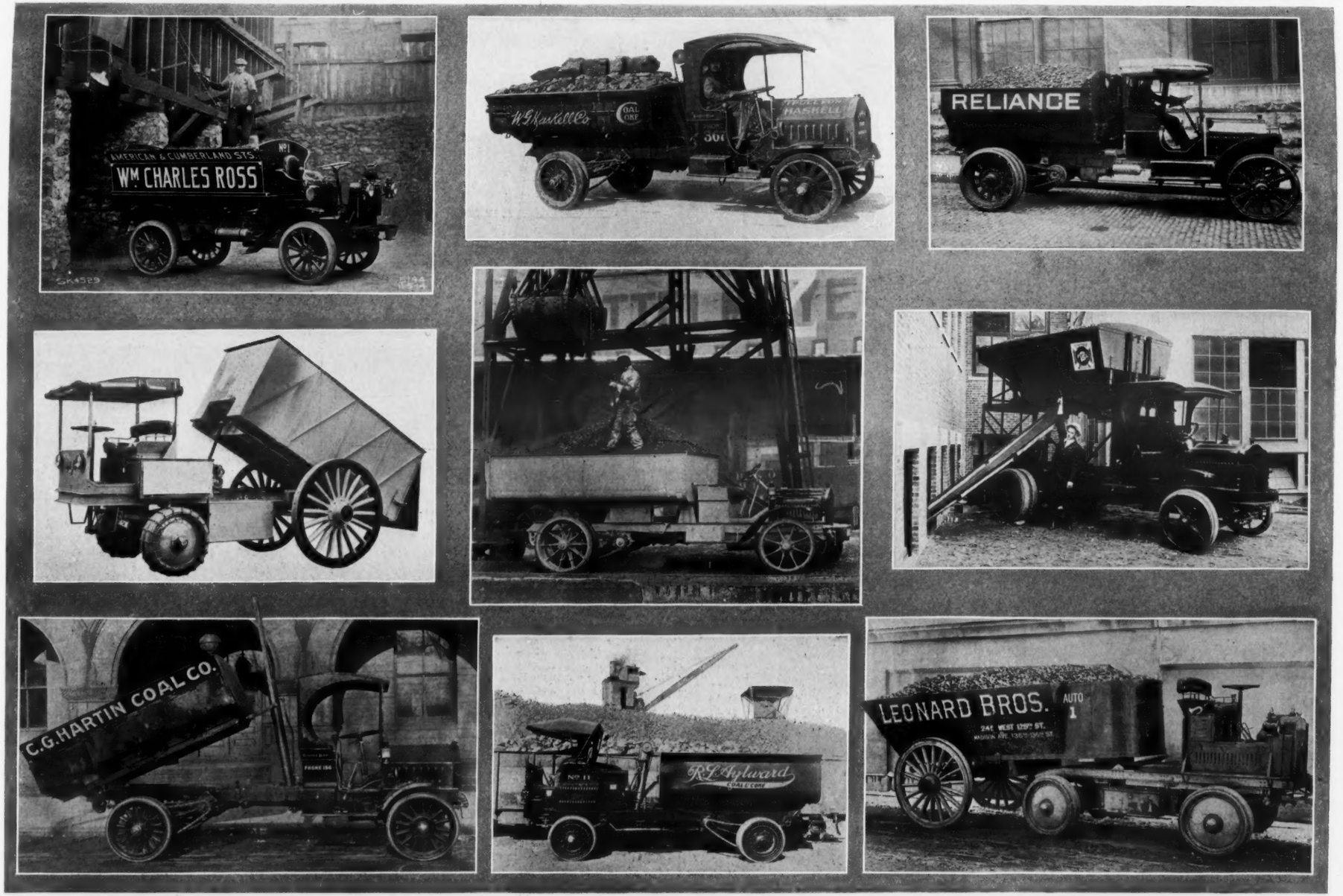


Group of Trucks Showing Various Types of Dumping Bodies Used for Coal Delivery

In the upper row is shown an Autocar just completing its load from overhead pockets. At the center top is an all-steel body used for hauling soft coal, by the W. G. Haskell Company. Notice the apropos slogan on the hood. The truck at the right is an Armleder. At the center is shown bucket loading device of a White truck. To the right another of the same make, with novel body, which is elevated by four screws. The height is shown by the man. At the left is an automatic Couple-Gear body with electric motor power hoist by screw. This carries the load on steel tires on the rear wheels. The lower line shows at the left a hydraulic hoist on a KisselKar. At the center is a GMC taking on a load of soft coal direct from the cars. The right is a short-wheelbase four-wheel drive Couple-Gear electric tractor with a ten-ton coal body, carrying sixty-five per cent of the load on steel tires.

GMC and Packard Dump-Body Trucks Hauling Asphalt for Detroit Department of Public Works

cent. is charged off for depreciation and maintenance, admittedly a generous allowance in spite of the hard usage to which the trucks are subjected. They cost. approximately, $5000, the charge off being $1250 yearly. However, the paving season is only of 210 days' duration, which makes the daily depreciation average $6. This, with oil and wages, brings the cost of operation up to $11.73 for 30 tons, or 40 cents per ton, a very material saving with trucks even on this broad gage basis. So satisfactory has the service proved that, as rapidly as possible, the asphalt department will be completely motorized. During the winter months these trucks are frequently used by the street cleaning department to haul snow and ice from the downtown thoroughfares, dumping it either in the main sewers or the river. Here, their efficiency is again shown, for where it takes a wagon 60 to 80 minutes to load and make a round-trip, with the trucks only 17 to 18 minutes is required. Furthermore, the trucks carry 75 per cent. more in each load than the wagons.

On another occasion when the operations of a Packard were noted in comparison with a team, the results were as follows for the truck and team, respectively:

	Truck	Team
Length of haul	4½ miles	4½ miles
Weight of load	13,035 lbs.	7070 lbs.
Time on road (loaded)	29 mins.	1 hr. 55 min.
Time on road (empty)	26 mins.	1 hr. 45 min.
Time to unload	1 min. 30 sec.	5 minutes
Time to load	12 minutes	7 minutes

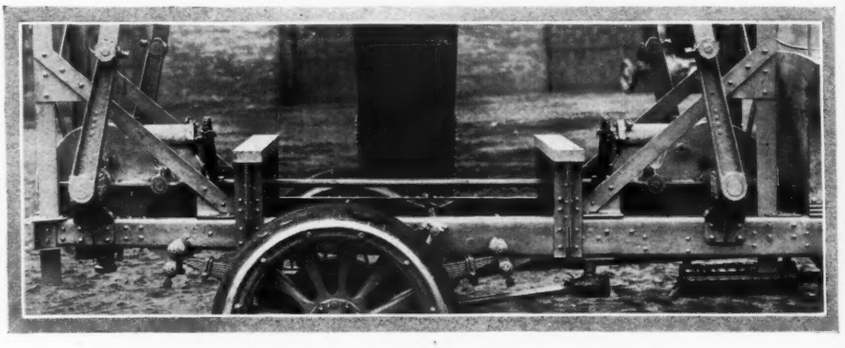
THE NEW WHITE POWER-HOISTING BODY

A new type of power hoisting body on a special one and a half ton truck for the retail delivery of coal, utilizing the principle of worm-operated lever arms in the elevating mechanism, is being introduced by The White Company, of Cleveland, following a series of exhaustive tests in which the new truck has shown a great saving of time and obviated many of the inherent difficulties in retail coal delivery.

This new medium-duty coal truck is designed especially for the rapid discharge of coal directly into manholes, basement windows, etc., in the congested business sections.

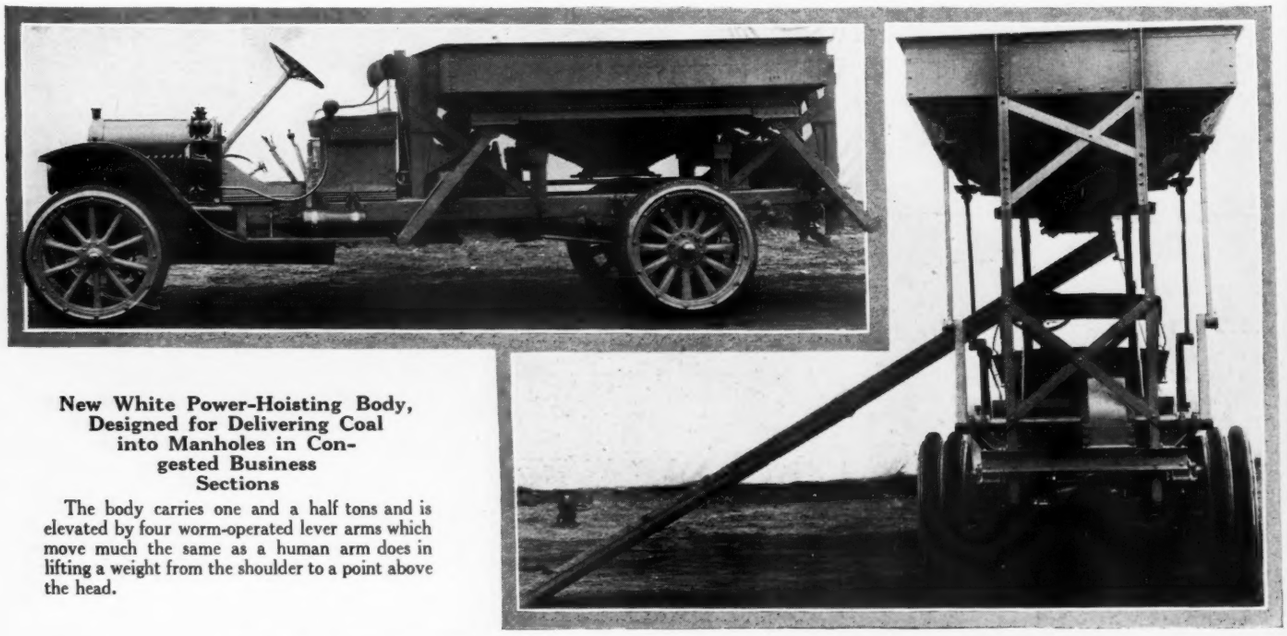
The body can be hoisted in 30 seconds and the chute may be used on either the right or left side. An advantage of setting up the chute on either side is the possibility of delivering the coal into a sidewalk manhole without obstructing traffic or violating traffic ordinances, or in cities where the municipal ordinances forbid sidewalk dumping.

The new design is particularly interesting because of its simplicity. The body has a capacity of 72 cu. ft. It is elevated by



Detail View of the New Power-Hoisting Coal Body

The worms are driven by sprocket and chain from a longitudinal shaft and this shaft is driven by the power transmission of the truck



New White Power-Hoisting Body, Designed for Delivering Coal into Manholes in Congested Business Sections

The body carries one and a half tons and is elevated by four worm-operated lever arms which move much the same as a human arm does in lifting a weight from the shoulder to a point above the head.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

four lever arms, two at the front and two at the rear, which are attached to the ends of transverse shafts which are turned by worms and gears. The worms are driven by sprocket and chain from a longitudinal shaft and this shaft is driven by the power transmission of the truck.

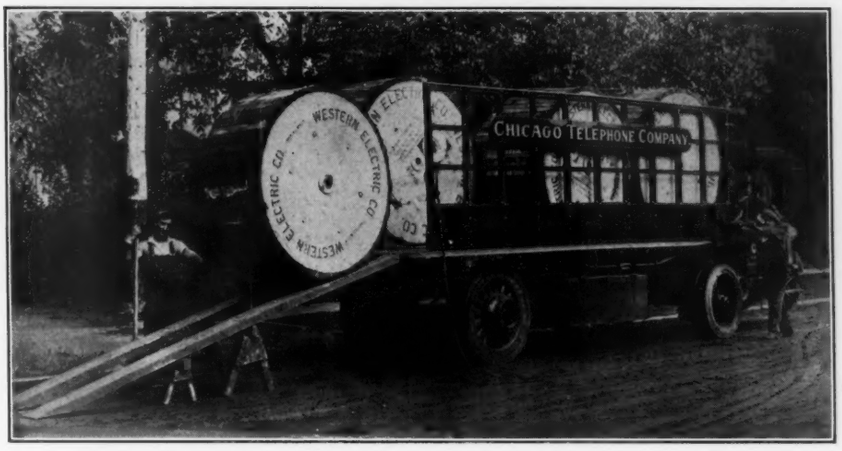
When the body is being hoisted or lowered, its vertical stability is maintained by four legs which slide up and down in four guides mounted upon, and braced from, the frame of the truck. The mechanism is built with an automatic shut-off which is brought into action when the body reaches the extreme top and bottom positions.

WHAT A TELEPHONE COMPANY DOES WITH A TRACTOR AND TRAILER

THAT the combination of a tractor and trailer permits of extraordinarily heavy hauling is exemplified in the case of the Chicago Telephone Company, which employs the largest motor-driven heavy-unit transportation outfit in the windy city.

The tractor used is the Knox, which, being well known to our readers and described in previous issues of this journal, needs no further comment. Chief interest centers in the trailer which was built by J. Press & Sons, of Chicago, with the co-operation of the telephone company. Previous to the use of this trailer an old ten-ton truck was rented and attached to the tractor. This experiment convinced the users that the plan of a tractor and trailer was feasible, but the trailer capacity was insufficient, it only being possible to carry four reels at one time. What was needed was a trailer that would carry six reels of any weight. The next problem was to build a trailer sufficiently heavy to do the work and still not interfere with city street ordinances; also flexible enough to withstand the excessive vibration caused by moving heavy loads rapidly over cobblestone pavements.

The trial run surpassed all expectations, and it was found possible to haul practically any load up to 25 tons with safety, 18 tons being carried as an average. One of the chief difficulties to be overcome in building this trailer was the construction of the rear axle. This was made of chrome-nickel steel, 5¾x4½ in., entirely



Chicago Telephone Company's Ten-Ton Trailer Pulled by a Knox Tractor

The trailer body is twenty-one feet long and seven feet wide, inside; the complete length of the whole outfit being thirty-four feet. The forward end of the trailer is equipped with a ten-ton sliding-drum winch, which enables one man to lower a reel of cable very easily, and also enables the crew to load such reels off the street without outside assistance.

hand-forged and milled, and afterward heat-treated. The rear wheels of the trailer are made with old type wooden hubs, with 6 in. spokes and 4x8 in. felloe. A ½-in. iron sweat band is used to draw the wheel into its position, after which two, 4x1½ in. steel tires were set on the wheel over the sweat band, and the whole bolted to the felloe. The wheel boxes are made of bronze, with grooves for lubrication. Grease is fed through the hubs by means of two cups. The wheels weigh 400 lbs. each, and the whole machine weighs 10 tons, but due to the tires being so broad, no injury is done to the pavement in any way.

With the installation of this outfit it is possible to keep the pulling-in gangs busy, while storage of the reels on the streets is eliminated. Although hauling reels of cable is the main duty of this tractor and trailer, the company believes a great saving can be effected by delivering switchboards, poles and other weighty and bulky goods.

PACKARD TRUCK IN LUMBER BUSINESS MAKES PROFITABLE SHOWING

Some nice problems in transportation cost are involved in the handling of lumber because of the varying conditions under which it must be loaded and unloaded; hence it is sometimes difficult to lay down one set of figures that would fit another case. However, certain general principles may be applied to a wide range of cases where loading and unloading facilities are practically identical. The accompanying schedule is that of a Packard four-ton truck operated by a Cleveland lumber company, the 10-hour routine being based on loading from a roller platform in the yard and unloading from a roller platform on the truck. The operating costs per 10-hour day, are based on the actual cost per mile for running the truck which, it might be stated, has a governed speed of 12 m.p.h.

Operating Schedule:	Mile 1	Mile 2	Mile 3	Mile 4	Mile 5	Mile 6
Distance						
Loading time	10 Min.	10 Min.	10 Min.	10 Min.	10 Min.	10 Min.
Running loaded						
10 M. P. H.	6 Min.	12 Min	18 Min.	24 Min.	30 Min.	36 Min.
Unloading (roller platform)	.10 Min.	10 Min.	10 Min.	10 Min.	10 Min.	10 Min.
Running empty	6 Min.	12 Min.	18 Min.	24 Min.	30 Min.	36 Min.
Total round trip time	32 Min.	44 Min.	56 Min.	68 Min.	80 Min.	92 Min.
Delivery Costs—						
Loads per 10 hrs.	19	13	11	9	7	6
Miles	38	52	66	72	70	72
Operating cost per 10-hr. day based on mileage	$7.85	$9.64	$11.44	$12.21	$11.96	$12.21
Delivery cost per M feet—						
Yellow pine	$ .17	$ .30	$ .42	$ .56	$ .70	$ .81
White pine	.12	.21	30	.40	.50	.58
Mill work	.10	.18	.26	.34	.43	.51

Loading a Four-Ton Packard From a Roller Platform

The ten-hour routine maintained by this truck is based on loading from a roller platform in the yard and unloading from a roller platform on the truck

Yellow pine, 3000 to 3500 lbs. per M board ft., 2½ M ft. per load; white pine, 2000 to 2500 lbs. per M board ft., 3½ M ft. per load; mill work, 1800 to 2000 lbs. per M board ft., 4 M ft. per load.

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Motor Trucks *vs.* Teams in Street Paving Work

Cost Data of a Large Eastern Asphalt Paving Concern. Trucks Show Saving of Seven and a Half Cents Per Ton Mile

By CLARENCE B. MONTGOMERY

THE following is a complete digest and analysis of the hauling problem as applied to the asphalt paving business and which would be substantially the same for any similar line.

There is from 55,000 to 80,000 tons per year of asphaltic mixture to move or approximately 360 tons per day. This material is moved from ¼ mile to 12 miles, an average being 4 miles. Up to July, 1913, all hauling was done by hired teams; the cost per 10-hour day being $5.50, including the driver. These teams carried approximately three tons per load and traveled from 8 to 20 miles per day.

From July, 1913, a fleet of fourteen motor trucks has been used, being supplemented by teams to meet the fluctuating needs of the business. The trucks, unlike the teams, are owned outright by the company. The results of this company's experience prove conclusively that it is cheaper to haul by trucks than by teams where there is any considerable quantity of material to be moved from one point to another. It is difficult to say just what constitutes a "considerable quantity" but in general where there is a volume of hauling sufficient to require three or more teams, trucks could be used to advantage.

In the following figures all hauling is expressed in terms of ton-miles to afford comparison between different methods, etc. A ton-mile is one ton moved one mile so that the ton-miles made for any given time may be found by multiplying the average weight per load by ½ the miles run.

The following table shows the detailed cost per ton-mile of truck hauling; the cost per ton-mile for team hauling and the difference between the two.

Operating Cost Per Ton Mile

Gasoline, Oil and Grease	.0225
Tires	.0249
Driver	.0300
Repairs	.0651
Depreciation	.0268
Insurance	.0114
License fee	.0015
Total average cost for trucks	.1822
Total average cost for teams	.2580
Average saving per ton-mile by use of trucks	.0758

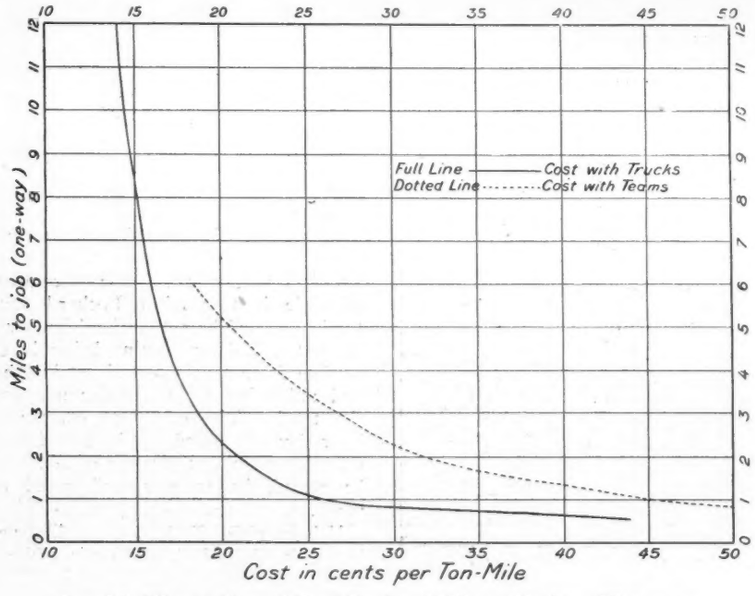
These items may be further explained as follows:

Gasoline, Oil and Grease: Trucks travel about 2¼ miles per gallon of gasoline.

Tires: Tires are guaranteed by dealers for a certain mileage, thus giving a cost per mile. This divided by one-half the tons per load gives the cost per ton-mile.

Driver: Drivers are paid $3 per day, overtime extra. In addition to this, a superintendent is employed, whose salary is divided between "Driving" and "Repairing."

Dumping Hot Asphalt With Truck Saves Time and Money


Full Line ——— Cost with Trucks
Dotted Line ·····Cost with Teams
Miles to job (one-way)
Cost in cents per Ton-Mile
10 15 20 25 30 35 40 45 50
0 1 2 3 4 5 6 7 8 9 10 11 12

Graphic Illustration of Cost Per Ton Mile at Various Distances For Both Teams and Trucks

Repairs: A force of five mechanics is employed, three on day shift and two on night shift. This item also includes all new parts and replacements as well as a portion of the superintendent's time, mentioned above.

Depreciation: A flat rate based on a life of 3 years has been used. All things considered, this is believed to be the best method of handling depreciation.

Insurance: All trucks are protected against loss by fire, accident, etc. Premiums paid yearly.

License Fee: Self-explanatory.

The accompanying cut shows graphically this cost per ton-mile at various distances for both teams and trucks.

A careful study of this chart brings out several interesting facts.

First, it shows that hauling by trucks is cheaper at every distance than by teams.

Next, it shows, contrary to common belief, that the saving is greater on the shorter hauls.

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This is explained by the fact that while the short haul rapidly decreases the efficiency of the vehicle, this decrease affects both trucks and teams in about the same proportion while the trucks have the advantage mentioned above that some of their expenses are reduced with the miles run.

On the other hand, some of the operating charges on trucks are proportional to the miles run. This is true of "tires" and "gasoline" and to some extent "repairs." Thus, the expenses per day are less for short hauls than for long.

While the above are very good averages, they are subject to considerable variation, depending on the length of the haul, or, in other words, the number of loads per day. It can be readily understood that since there is a certain amount of lost time per trip in loading and unloading; as the length of the haul decreases, the miles per day of the carrier is diminished. The following table gives the average miles per day at various distances.

Average Miles per Day at Various Distances

One way distances	Teams	Trucks
½ miles	8 miles	13 miles
1 "	9 "	26 "
1½ "	10 "	31 "
2 "	12 "	35 "
2½ "	13 "	39 "
3 "	14 "	42 "
3½ "	15 "	45 "
4 "	16 "	48 "
4½ "	17 "	51 "

One way distances	Teams	Trucks
5 miles	18 miles	53 miles
6 "	20 "	56 "
7 "		60 "
8 "		63 "
9 "		65 "
10 "		67 "
11 "		69 "
12 "		71 "
Over 12		73 "

It is probably economical to always use some hired teams; otherwise, a large hauling equipment would be required which, during the dull periods, would stand idle.

Thus, when it becomes necessary to use teams, it is better to use them on the longer hauls; up to 5 or 6 miles, which is about the limit for efficient team hauling and use trucks for the extreme short hauls, and for hauls over 5 or 6 miles.

It may not be desirable to adhere rigidly to this rule where the use of trucks on short hauls would overtax the capacity of the loading plant and cause congestion.

The trucks carry an average load of 5.9 tons and make about 41 miles per day. The average number of ton miles per day is 120. The idle time due to break-downs, repairs, etc., amounts to 34 per cent. of the total. Thus, to every 2 days a car works, it loses about 1 day. This percentage is admittedly high and is the result of an unfortunate series of accidents, breakages, etc.

TRAILERS SHOW SAVING IN KANSAS CITY

By J. E. FOLAND

There are at the present time but few trailers in use in Kansas City. This is largely due to the very steep hills and the bad condition of the streets and to the fact that the truck users here have not given the trailer a trial. Some few of the firms that have a great amount of heavy hauling are now trying out the heavy types of trailers and in every instance they are proving to be paying propositions.

The Kansas City Structural Steel Company is now using a Knox Tractor and two trailers in addition to a three and a half ton Alco truck. These trailers are of the two-wheel type, built for extra heavy loads. The larger of these has a reach of 45 ft., with a 58-in. wheel, which is covered with an 8x1¼-in. steel tire. The smaller one has a reach of 22 ft. with a 48-in. wheel, which carries a 6x1¼-in. steel tire. A load of 21,000 lbs. has been carried with the larger of the trailers.

According to those in charge of these carriers the only objections that can be found with the trailers is that under extra heavy loads the tires creep and shear off the bolts which hold them to the wheels. This causes cracked hubs and worn tires. But despite these objections they show a great saving when compared to the trucks and horses.

The following is a comparison of the cost of hauling with the trailers, the trucks and with teams. It is for the 6 months that the trailers have been in use. At a glance the saving can be seen.

Tractor and Trailers

	Tons.	Operating Cost.	Cost per Ton.
July	464.2	$339.68	.73
August	401.3	394.71	.98
September ...	131.4	263.14	2.00
October	263.4	402.85	1.53
November ...	254.3	345.45	1.36
December ...	89.1	363.51	4.08
Totals	1603.7	$2109.34	1.32
Average ...	267.2	351.55	1.32

Truck

	Tons.	Operating Cost.	Cost per Ton.
July	255.	$393.38	1.54
August	225.9	299.81	1.33
September ...	128.7	251.88	1.95
October	147.9	521.00	3.52
November ...	161.1	303.35	1.88
December ...	87.5	310.72	3.55
Totals	1006.1	$2080.14	2.07
Average ...	166.0	346.69	2.07

Teams

	Tons.	Operating Cost.	Cost per Ton
July	8.4	$70.35	8.38
August	11.4	53.61	4.70
September ...	6.1	16.50	2.70
October	30.1	73.60	2.45
November ...	16.5	23.00	1.39
December ...	.5	2.00	4.00
Totals	73.	$239.06	3.27
Average ...	12.1	39.84	3.27

The operating cost figures include labor, gasoline, oil, tires, depreciation, insurance, proportion of license, repairs and maintenance. The teams were hired at a cost of $5 per day.

Following is a comparison of the hauling costs for the 2 maximum months that these trailers have been in use:

	Trailers.	Trucks.	Teams.
Total cost	$809.74	$763.38	$434.35
Total tonnage ...	865.5	481	242.6
Cost per ton.....	$.94	$1.59	$1.79
Total trips	106	143	85
Cost per trip	$7.64	$5.34	$5.11
Total mileage ...	1190	2070	.....
Cost per mile ...	$.69	$.37	.....
Total days operated	40	52	46
Cost per day....	$20.24	$14.70	$9.44
Average trips per day	2.7	2.8	1.8
Average tons per trip	8.2	3.4	2.8
Average miles per trip	11.2	14.4	.....

A study of these figures will show that by the use of trailers that are capable of holding up under heavy loads, a great saving can be had.

Neil G. Lilley, secretary of the Kansas City Structural Steel Company, who watches the hauling closely, gives as his opinion that trailers are just what they have been looking for these many years. In talking of those that they now have in use, he said: "From the standpoint of the vehicle best adapted to our work, experience shows that we can haul our product with the tractor and trailers for approximately 66 2/3 per cent. of what it would cost us to haul it with the ordinary truck. One item not included in cost of operation, and which is considerable, is saving labor in loading by using two trailers. We have a special arrangement whereby one is loaded while the other is in transit. This enables us to keep our tractor moving continually and causes less confusion in the loading yard."

A huge crane is employed in the loading of the trailers. The trailer is pulled under the crane by the tractor and the front end of it is bolstered up. When the tractor returns, the trailer is loaded ready to be moved.

What is said to be the largest double dump trailer for trucks and tractors can now be seen in use on the streets of Kansas City. It is guaranteed to carry 15 tons. It is built of steel, weighs 8200 lbs. and is 19 ft. 3 in. in length and has five-foot wheels. The opening for material is 16 ft. by 39 in. The clearance under doors when they are open is 25 in. Its entire height is 6 ft. 6½ in. The width at the top of the hopper is 6 ft. 11 in. One of these is now being used by the Metropolitan Street Railway Company, but as yet no figures as to its operating cost are obtainable.

Two Trailers Used by the Kansas City Structural Steel Company

According to the officials of the company, the tractor and trailer haul their product for 66⅔ per cent of what it would cost to haul the same with the ordinary truck

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Jitney 'Buses in Los Angeles*

By C. L. EDHOLM

WHILE many of the street car companies, whose earnings are seriously diminished by the introduction of the jitney 'bus, predict the early abandonment of the idea, thousands of users and the owners of these vehicles think the movement a lasting one. It will require a couple of years of actual test to determine just how the loss and gain will balance in the business of carrying automobile passengers 4 or 5 miles for a nickel each. If fuel remains at its present low price, between $.10 and $.12 a gallon, and if no more taxes and licenses are piled on the 'bus owners' shoulders; if ordinances aimed at this enterprise fail to pass, it seems as if the little rival of the slow and unwieldy street car will win out.

Regular Routes

Nowhere are conditions more favorable than Los Angeles, where the jitney first operate extensively. The streets are excellent, mostly on substantial foundations and surfaced with asphaltum, and the grades are easy, over the greater part of the city. It is the habit of the 'bus drivers to follow the car lines, and the beginning was made over a route about 5 miles from the center of town, which was through a thickly settled part of the city, but for some reason had a very unsatisfactory car service. The results were astonishing. Passengers would pay a nickel for the privilege of clinging to the running board, or would crouch upon the fenders, and in the early days of jitney operation, the intake for a big car ran as high as $2 an hour. The street cars were so infrequent, and were so badly crowded that the passengers were willing to submit to almost any inconvenience in riding upon a small automobile that would at least cut the running time of the trolleys in two.

Of course this led to a rapid increase in the number of the 'buses, and the evil of overcrowding corrected itself presently. Other routes were taken up, one at a time, until at present nearly every street car line in the city has to compete with its small and lively rival. The trolley gives a longer ride for the money, but this is about the only advantage it has to offer, and it is offset by the increased speed and the greater comfort of the motors.

Taxicab Service

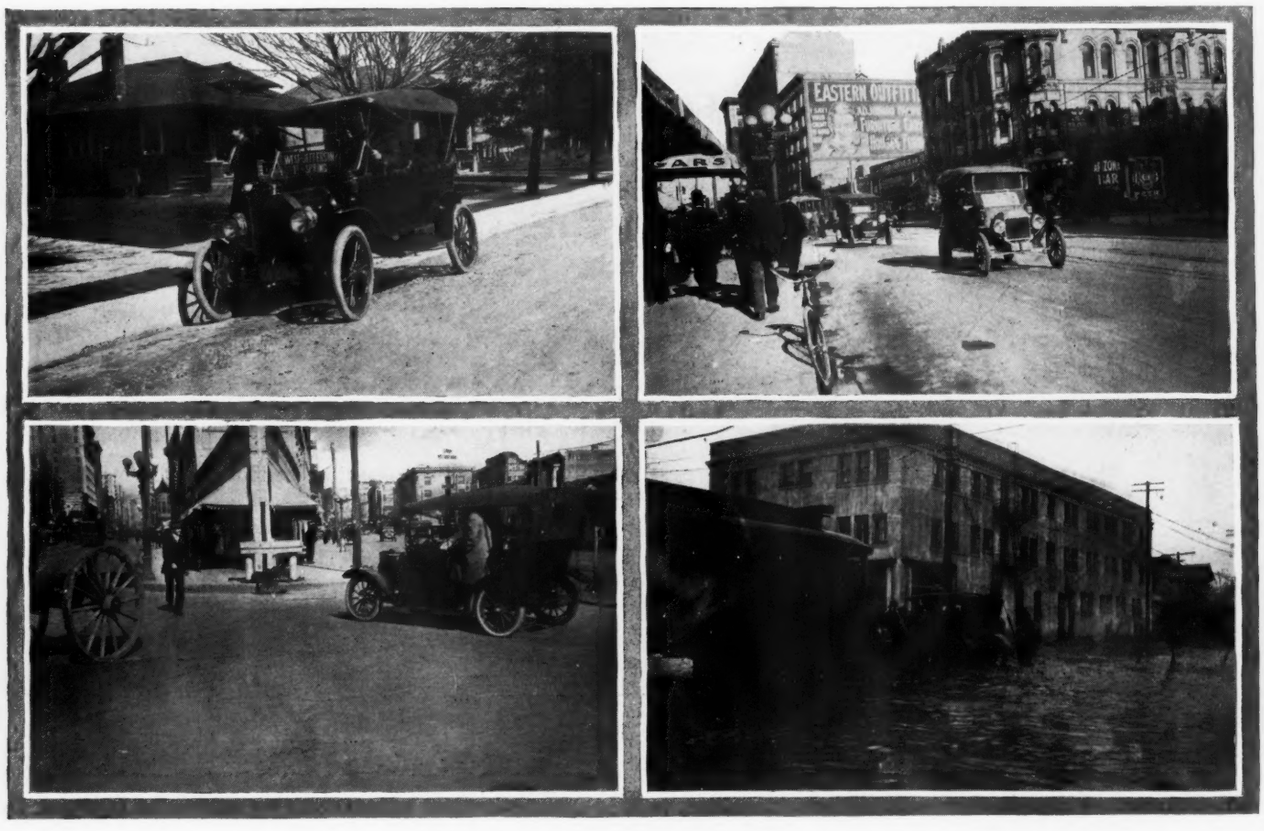
Another enterprise which must submit to the rivalry of the "jitney" is the taxicab. It is nothing unusual for the 'bus owner to receive the instruction "take down your sign," when one or two persons enter his car down town, and on payment of his average collections for a trip, $.50 or $.60, the driver will not only pass up other people waiting at the corners, but will carry his passengers a few blocks off his route and leave them at their door, or if desired, will leave his route entirely, performing regular taxi service for about half the taxi fee.

Legislation Regulating Operation

While the taxicab owners complain about this proceeding, they really have no grounds for any grievance, as the jitney driver pays the regular taxi license to the city of $60 a year, besides the State license of $10 or more, according to the h.p. of his car, a chauffeur license of $2, a fee for the badge and, in addition to this, a personal property tax on his machine.

In spite of these burdens the 'bus owners seem to be satisfied with their profits, and the association which they have formed is making no objection to the proposed indemnity bond of $10,000 on each car, to insure passengers a chance to collect damages in case of accidents. The drivers, most of them owners, claim that they are making clear profits of $4 or $5 a day—good living wages. They claim that they are serving the public by handling the rush-hour crowds, which the street railways

*The peculiar traffic and climatic conditions of Los Angeles make its usages not applicable to many other cities.—Ed.



Jitney 'Buses in Los Angeles

Upper left shows a passenger being left right at her home, for an extra nickel; upper right shows the signs on two jitneys; lower left shows passengers on the running boards, a practice prohibited in some cities; lower right shows a jitney in wet weather, when it is especially appreciated, for it takes its fare from the curb, instead of the middle of the street.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

cannot take care of. The organization is prepared to fight through the courts all class legislation or unfair restrictions designed to cripple the business, and the regulations proposed by those interested in suppressing the jitney 'bus are frequently absurd in their unfairness. It has been proposed to restrict the operation of the little motors to their regular routes, and also to keep them out of the center of the business district, thus cutting into the regular trade, and doing away entirely with the occasional extra runs or taxi service. It was also proposed that they should take on or deposit passengers, not at street corners, where people are accustomed to board cars, but in the middle of the block. This is ridiculous, on the face of it, as there is no room at the curb in the business districts, except for the space of 100 ft. back from the street corners. Regarding the fares to be charged, the enemies of the jitney, not knowing their own mind, proposed first a maximum charge of $.05 and later a minimum charge of $.10. The latest move is to force through an ordinance providing that the 'bus must stop to take on negroes, the plan being to make the 'bus unpopular by crowding people of both races into one small car. This problem is met at present by the drivers merely "failing to see" the signal of a colored person at the corner. At present no ordinance has been put through in Los Angeles regarding the new transportation system, as the public is strongly for it, while the corporations are bitter against it, and the council is apparently in doubt.

The City of Oakland has adopted the following rules: A license of $60 a year is collected. Liability bond of $10,000 for each car is required. Passengers are not permitted to ride on running board. Signs must be carried indicating route and termini, and route must be followed. Sign must be displayed indicating when car is full. Unless all seats are occupied, the 'bus must stop on signal. No greater fare than $.05 may be solicited. In wet weather antiskid tires or chains must be used on rear wheels. After dark, a light must be placed to illuminate the rear seats. The latter regulation is designed to suppress "immoral acts" and would be justified if the same rule applied to taxicabs, and if the indecent crowding of street cars during the rush hours were also regulated. The jitney drivers have called attention to this discrepancy, but make no protest against installing lights, as they are desirous of keeping the 'bus traffic above reproach.

For the same reason, there is no opposition to the proposed regulation against the drivers smoking or drinking while on duty. In fact, the tendency of the 'bus owners is to observe the traffic laws far more strictly than drivers of private cars, and to welcome any regulations that tend to elevate the tone of their business.

The rapid increase of this business on the coast is shown by a report compiled in San Francisco: However, it appears to be somewhat exaggerated.

	Number of Cars.	Daily Receipts.
San Francisco	300	$2400
Transbay cities	450	3600
Los Angeles	1050	8400
Portland	75	600
Seattle	500	4000

Types Adaptable

The type of car best fitted to this traffic at present is the light, five-passenger machine. The heavier cars cost too much for tires, parts and repairs to equalize the difference in passenger capacity. A few light delivery cars have been rebuilt with 'bus bodies, the seats facing each other as in the old-fashioned horse cars, but they are not as popular as the regular pleasure cars. The Fords are in such an overwhelming majority that the other makes hardly count; though all kinds of light used cars are being bought eagerly for this new venture.

Regarding the question of the ideal type of car to be built for that purpose, and a standard 'bus type to meet this need, the mistake must not be made of trying to carry too many passengers at a load. The advantage of the 'bus is the speed at which it can run, also the infrequency of the stops, and these advantages will be lost by putting on cars of large capacity.

The type of enclosed 'bus on the lines of the old-style hotel conveyance, with seats facing each other and with a complete enclosure is being tried out in Los Angeles, usually in the form of rebuilt commercial cars, but this kind of a conveyance does not appeal to the people as does a small pleasure car with upholstered seats and a certain amount of "class" in its appearance. A modified "rubber-neck" coach of a capacity of not more than twelve would seem to be about the right combination, and the less commercial its appearance, the more popular it will be.

Relieves Traffic Congestion

The fact that a small machine is easily handled in the traffic is another reason why it is popular. It does away with the objection raised by the city fathers that the jitney congests the streets in the rush hours. This is not true, but the reverse, as it actually tends to clear the streets by taking home the crowds in a shorter time.

During the rainy season in California, the jitney has been a real benefit to the public, and also to some of the short-sighted business men who have opposed it. It makes rainy-weather shopping possible, as it is customary to leave the passenger high and dry on the curb, instead of in the middle of a flooded street. Furthermore, for an extra nickel one can usually ride all the way home, a few blocks off the route of the street car. The complete tie-up of traffic caused by "power off" is also eliminated by the jitney, which runs independent of power house. In case of motor trouble which puts a car out of commission on a run with passengers, the fares are invariably refunded, and the next 'bus or a street car can be taken. If a street car company ever returns nickels under similar circumstances, I should like to hear of it. Many a time I have left a stalled trolley to walk home, but I have always left my nickel with the conductor.

'Bus Owners' Association Formed

The 'buses are operated by the owners as a rule, though a certain number are driven by hired chauffeurs at fair wages. An Auto 'Bus Owners' Association has been formed to facilitate some features of the business. The legal matters can be handled best through the organization, a Lost and Found Bureau maintained, and probably the indemnity fund will be made up by and for members. Regulations for the good of the business, but not a matter for city ordinances will be framed for members, similar to those in use by automobile clubs. There is no doubt that the 'bus is here to stay. If it cannot make a profit at $.05 a fare, it will continue on a slightly higher basis. The reason is simple. It gives the public what the public wants, and that is what the trolleys have not done, and apparently have not tried to do.

From a 'bus driver's daily record, showing mileage over regular route, running north (into town) and south; extra miles for special or accommodation runs; number of passengers carried, the gross receipts for route, both ways, and for extra trips, gasoline consumption and price, the following averages have been computed. It covers the period from February 2nd to 12th, inclusive. The price of gasoline varied from $.10 to $.12 per gal. during the period.

The average mileage was 44.4 per day; thirty-four passengers on the north trip and twenty-five on the south; the intake on the north trip $1.69, and $1.26 on the south; extra, $3.16; extra miles, 41; total number of passengers sixty-two, and total intake $6.12.

From this it can be seen that the extras for taxicab service constitute a substantial item.

JITNEY 'BUSES IN OHIO

By J. W. LEHMAN

The movement to establish "jitney 'buses" on a number of the streets of Columbus, Ohio, has not met with the success anticipated by the promotors. The movement was started by a half dozen individuals with touring cars. One of the drivers had equipped his touring car with a small 'bus body and could accommodate about a dozen passengers. One woman, Mrs. A. B. Powell, entered the field with a Ford touring car.

After operating for several days quite a few of the "jitney" drivers abandoned the plan as unprofitable. A week later only two were in operation. An order was issued by the Ohio Automobile Department that drivers of "jitney 'buses" must take the examination for professional chauffeurs and pay the usual fees. This order caused the woman to discontinue operation.

John J. Stanley, president of the Cleveland Railway Company, of Cleveland, Ohio, the city traction system, announces that steps are being taken to install a three-cent 'bus system to compete with the "jitney 'bus" lines being organized by H. E. Johnson, who is trying to organize a company with a capital of $100,000 to operate "jitney 'buses" in Cleveland. It is planned by the traction company to issue transfers from the 'buses to the traction cars and *vice versa*.

So strong is the "jitney 'bus" idea with the people of Toledo, Ohio, that the city council is considering a bond issue for the purpose of operating a municipally-owned "jitney" system.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

"JITNEYS" SHUT OUT IN DENVER

By CHARLES M. SMYTH

On the face of the thing this "jitney 'bus" business appears to be the birth of a new industry. But as in the case of all manner of births—animate and inanimate—only time will prove whether the "jitney 'bus" is to be a vigorous child with a long and healthy life or destined to a short life with a sad end.

Some street railway corporations appear to be badly frightened and are not backward about making their fright evident. Others appear to be taking the matter nonchalantly and show no outward agitation. All are no doubt contriving new methods and means by which to perfect their systems to successfully combat this new competitor.

In Denver, Col., where the street railway corporation has held a monopoly, there has apparently been little difficulty in nipping in the bud what appeared to be a dangerous competitor.

When application for license to operate jitney 'buses was made at the city hall not long ago, such license was refused. And when those applying showed signs of fight, it was found that no ordinance existed under which the city could rightfully refuse such license. This was the cause of a hurry-up order for a "made-while-you-wait" ordinance covering just such an emergency. A bill was introduced before a meeting of the city commissioners and was passed, and whether this bill was constitutional or unconstitutional, the result has been the same—at least temporarily—for the jitney bus has been unable to get a footing upon the streets of Denver. The bill, which is as follows, requires operators to obtain a franchise:

A BILL

For an ordinance making it unlawful for any person, firm, association of persons, or corporation, either as principal, officer, agent or employee, to use or occupy any street, alley or other public place, in the City and County of Denver, with any automobile or other vehicle whatever, for the carriage of persons for hire, and operating for the purpose of affording a means of local street transportation similar to that ordinarily afforded by street railways, by indiscriminately accepting and discharging such persons as may offer themselves for transportation along the way or course on which it is used or operated or may be running, without first obtaining a franchise from the City and County of Denver; and providing a penalty for the violation thereof; and also declaring any violation thereof a nuisance, and subject to summary abatement and removal.

Be it enacted by the Council of the City and County of Denver:

The vice-president and general manager of the tramway, John C. Beeler, hit upon the novel idea of shaping the people's minds so as to resent the advent of the jitney 'bus, when the matter of a franchise is put to a vote. He has caused to be printed in pamphlet form "A Modern Fable," which he has distributed from all street cars.

"The Modern Fable" has accomplished at least one result. It has proven that from a humanitarian point of view there can be a perfectly good argument entered upon each side of the case. To put a crimp in the jitney 'bus business, however, by refusing them an opportunity to prove their efficiency or inefficiency would certainly be a blot upon the freedom of the American people and American business. And on the other hand, to grant them the free use of the streets without any franchise or restrictions by merely placing a license upon each individual conveyance, while at the same time enforcing the many rules and restrictions upon the operators of the street railways, would be wholly unfair.

If the new mode of travel succeeds it will give the citizens a choice of travel and may eliminate what has heretofore been a monopoly.

Activities of the Motor Truck Association of Philadelphia

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COMMERCIAL CAR JOURNAL OFFICIAL ORGAN

The regular monthly dinner and business meeting of the Motor Truck Association of Philadelphia was held on Wednesday evening, February 17th, ir the banquet room of the Hotel Adelphia.

In the course of the business session a lively discussion was held as to the effect on the motor vehicle business of the various selling and service policies of the many concerns in the commercial car field.

President E. B. Jackson presided at the meeting. The topic of the evening was the continuation of the discussion of the paper read by E. S. Hare at the November meeting entitled "Ways in which the Salesman has Interfered with the Sale of Motor Trucks," and which was printed in our December issue, page 17.

George M. Graham, well-known automobile and sports writer, opened the discussion and enlivened the meeting with a satirical version of the paper, which, to use the vernacular, "brought down the house."

He was followed by Fred G. Browning, of the White Company, who gave an interesting talk on his early experience in the motor vehicle business with a thread of humor running through his remarks, defining what he believed to be the "Correct Service Policy to Owners." In summing up his talk, Mr. Browning's contention was that it was up to the dealer to do all in his power to help the owner, not before, but after the sale, not only along educational lines, but also as far as replacements are concerned. Speaking of replacements, Mr. Browning illustrated a case of a broken front axle. The owner came to the dealer and demanded a new axle or a repair without costs, claiming that the break was due to an imperfect forging. The dealer knows positively that such a break was the result of dropping into a two-foot hole and that no amount of usage could do such damage. The owner questions the driver; the latter swears that he was never near such a hole; the owner believes the driver, and the case is then up to the dealer. In such an instance, Mr. Browning contends that it is the best policy for him to replace the axle. He believes the fair-minded policy shown will be productive of a better feeling toward the dealer and the factory, and that even if the owner was "trying to put one over," his chances of repeating such a deal would not meet with success. Mr. Browning also believes that the salesman should be the deciding factor in making replacements, inasmuch as he has been more fully acquainted with the pros and cons of the situation.

Mr. A. C. F. Keleher, of the Foss-Hughes Company, was the next speaker. He spoke on the subject at great length, and cited many interesting experiences. He called attention to the fact that he found very little of the so-called "knocking" among truck salesmen, but that what is continually termed "knocking" is simply telling the truth. This, he claims, cannot be denied any salesman, and that as long as he gives a prospect facts that are "over and above board" and which can be substantiated by him, just so long is that salesman telling the truth and not knocking.

Mr. F. A. Kissel, Kelly-Springfield Tire Company, had the close attention of the assembly when he pointed out the elements of success in the selling branch of the tire business.

Mr. W. H. Metcalf, of the Bartlett Garages, Incorporated, outlined several plans that the board of governors of the association was working on for the benefit of the truck owner and the advancement of the industry.

Without a dissenting voice, the Motor Truck Association of Philadelphia voted on the invitation of the United Business Men's Association of Philadelphia to become a member of that body and to take an active part in the latter association.

The well-known clubman, Horace Dumont, of this city, entertained the members and guests with several fine vocal selections.

The president announced that at the March meeting a prominent business man of this city would be the speaker, and at the April meeting there would be a minstrel show given by the members of the association.

The CCJ leads in circulation, advertising and prestige

New Trucks at the Boston Show

NEW KISSELKAR FIVE-TON TRUCK

THIS new model of the KisselKar Company, of Hartford, Wis., was exhibited for the first time at the Boston Automobile Show. It is of unusually heavy construction throughout for a truck of its capacity, and at first glance would readily be mistaken for a seven-ton truck. It has a wheelbase of 168 in. and a tread of 72½. The turning radius is 26 ft. The chassis weighs complete 7900 lbs. The loading space is 14 ft. in the clear, back of the driver's seat, the engine being under the hood. The width is 6 ft. and the height from the floor 48 in.

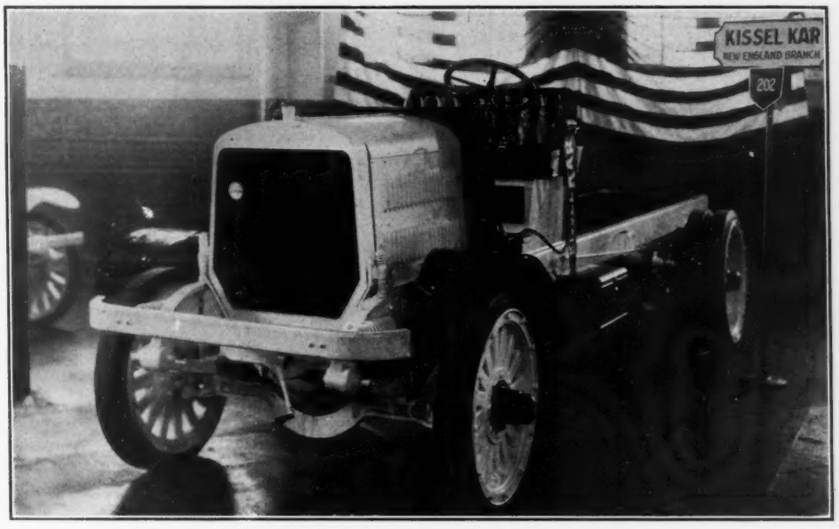
Briefly, the arrangement is as follows: Engine at the front, cone leather faced clutch. Three-speed transmission, combined with the differential on the jackshaft. Double side chains to the rear wheels.

Engine

The power plant is a four-cylinder L-head engine, cylinders cast in pairs. Bore 4⅞ in., stroke 5 in. Mounted on four integral arms of the crankcase to a subframe. This engine follows throughout KisselKar practice, as used on the other models. Ignition is by Bosch dual system; lubrication by splash and forced feed by gear pump. The entire power plant is mounted on springs on the subframe, giving a flexible mounting, which obviates the necessity of a three-point suspension. The cooling is by centrifugal pump and large cellular radiator, spring supported on the main frame. The system contains 10 gals. of cooling water. A large leather faced cone clutch is fitted with adjusting springs under the leather, giving smooth engagement. The driving shaft is mounted between two large Spicer universal joints.

Special Features

There are several features to which the company is especially calling attention, one being the differential lock. This consists of a Timken key, which locks the parts of the differential together and is controlled by a short lever at the front of the driver's seat, the construction being such that the driver must hold this in engagement in order to keep the differential locked. It disengages the moment released, so that a driver cannot leave it in and forget it. This enables the truck to drive as though both wheels were on a solid axle, thus enabling it to extract itself from bad mud holes.



Five-Ton Addition to the KisselKar Line
L-head engine, 4⅞ x 5 in.; wheel base, 168 in.; tread, 72½ in.; loading space, 14 x 6 ft.; platform, 48 in. high; Chassis, $4000

The radiator is featured because it is said to be the largest used. It is of Mayo manufacture and has a capacity of 10 gals. In the rear axle construction is massive, the largest taper roller bearings being used. This is, therefore, a feature of the construction. The transmission size is also a feature, it being the principle of construction of this company to use a transmission of 1½ tons greater capacity than the rating of the truck. The spring suspension of the engine is also to be enumerated among special features.

Frame and Springs

The frame is the largest size, built by Parish & Bingham, side bars 8 in. deep, 1¼ in. gage. The springs are made of special steel, the front 3 in. wide, length 42, rear 3½, length 54, and auxiliary cross spring is also supplied 54 in. long and 3 in. in width. The rear springs are underhung, with massive cast steel caps, each spring being held by two U bolts, with double nuts on the upper end. The adjustable length radius rods are steel castings, with a pivot and swivel front end mounting.

Brakes

The foot brake is external, contracting on each side of the differential on the jackshaft. The drums are about 14 in. diameter by 4½ in. face. The emergency brake is internal expanding in the rear wheel drums and controlled by hand lever at the center. Steering wheel is at the left. Spark and throttle controls beneath. An auxiliary push button in the floor is also provided. The steering gear is worm and worm sector, the connecting links being at the rear of the front axle, with their ends provided with boots, grease filled.

The wheels are 36 in. in diameter at the front and 40 in. at the rear. The front tires are 5 in. in width. The rear wheels carry dual 5-in. tires. Short running boards are fitted at the side of the driver's seat.

Price

The chassis sells for $4000 f.o.b. factory, and the standard stake body for $4125. Price on special bodies on application.

General View of Truck Exhibits
A liberal space in the basement was devoted to commercial car exhibits, at the Boston Show

The CCJ has most advertisers because it gives them biggest returns

Worm Drive Netco Trucks, Chassis $2250

THE New England Truck Company, with works in Fitchburg, Mass., at the Boston Automobile Show exhibited for the first time Netco trucks; capacity 3000 lbs.

The engine is 4⅛x5¼ en bloc, Continental. Rated as 30 h.p. The ignition is Eisemann, using fixed spark.

Arrangement of Units

The dry clutch faced with Raybestos is housed with the flywheel. This is claimed to be oil, water and heat proof. The change speeds are by Brown-Lipe. The drive to the rear axle is through universal joints and propeller shaft to a well-known worm axle construction. The front axle is drop forging of I-section.

The engine following general practice is under the hood at the front. The control levers are in the center, with the steering wheel at the left. The truck has a wheelbase of 144 in. tread standard. The wheels are 36 in., 3½-in. front, 5-in. rear solid tires, and fitted with S.A.E. rims.

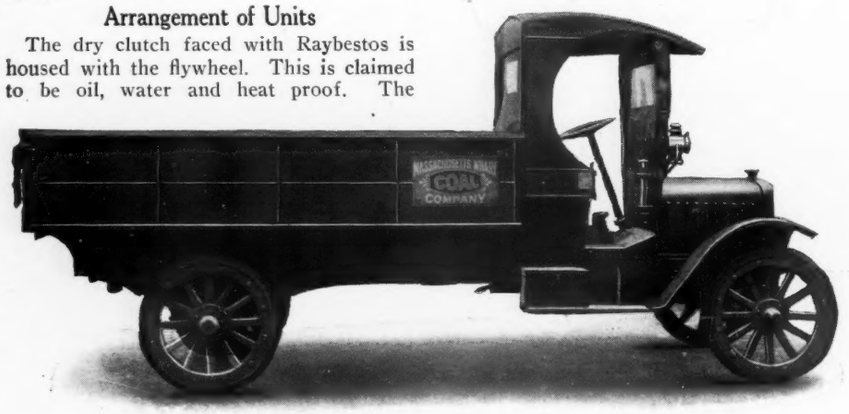
The steering gear is of the worm and nut type, specially built for heavy duty work, controlled by an 18-in. steering wheel. The cross connecting link is at the rear of the front axle.

Special Features

Aside from the fact that the truck is worm driven, a novel construction is the method of retaining the rear semi-elliptic springs on the rear axle housing. This consists of a heavy steel casting, ribbed and held by six ¾-in. bolts, with nuts and lock washers, which fasten the rear springs very rigidly to the rear axle housing. An accompanying illustration gives an idea of this construction.

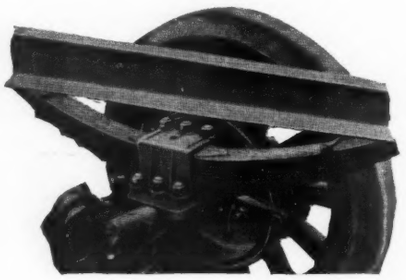
A feature is the use of the Pierce speed controller, driven from the propeller shaft and controlling the speed of the truck to 15 m.p.h. on high gear, but permitting only engine power on the lower gears. This is a very advantageous method of speed control.

The radiator has a tank at the top, and is fitted with vertical fin tubes of Rome-Turney construction. The engine front support is a cross drop forged member, from which the front end of the engine is suspended on a swivel, the rear end of the engine being supported on the main frame by integral arms of the flywheel and crankcase housing. This gives the engine a three point suspension. Westinghouse starter is supplied, if desired, at $200 extra. An auxiliary push button is provided in floor, which is cast aluminum. This pedal is unusual, as it operates directly on the throttle without a series of bell cranks and intermediate levers.



Worm Drive Netco, Chassis $2250

Engine 4⅛ x 5¼ in., Continental; wheelbase, 144 in.; Pierce Speed Controller; worm drive rear axle



Netco Spring Attachment

Note the massive casting and six bolts

Frame and Springs

The frame is of heavy channel section, pressed steel 5 11-16 in. in depth, narrowed at the front. The top and bottom flanges are 3¾ in. in width. The center and rear cross frame members are of channel section, with heavy gussets bracing it to the side members. An intermediate cross member is of cast steel arched type, channel section. The rear springs are semi-elliptic, 50 in. in length, 3 in. wide, fourteen leaves, hung at the front end from cast steel hangers and at the rear, shackled to a cross bar, carried in cast steel supports on the underside of the frame. The front springs are also semi-elliptic, 40 in. long, 2½ in. wide, nine leaves,—mounted on top of the front axle. All spring bolts are provided with grease cups.

Brakes

Two sets of brakes are supplied on a single pressed steel drum of 16 in. diameter, 3 in. face. The internal expanding brakes are of band type, controlled by the center hand lever, which is of pull type. The external brakes, operating on the same drums, also the band type, are controlled by the right pedal. All brakes are fitted with single-tree type equalizers, the connections being by steel rods inside and parallel to the frame side members. The brake and clutch pedals are mounted on a support which is a steel casting, forming a box with the side frame member. The cross shaft supporting the brake connection and equalizers is hollow and provided on the end on the outside of the frame with an oiling cup, which takes care of all brake arms.

Equipment

The car sells for $2250 without body. Any type of body can, of course, be purchased, the makers designing and building them to order. The regular equipment consists of a cab front, with curtains, odometer, hand-Klaxon, headlights, Prest-O-Lite tank, tail lamp and full set of tools with jack.

Winton Hearse Exhibited at Boston

The Winton Motor Car Company, 674 Commonwealth Avenue, Boston, Mass., showed this hearse, which is mounted upon a thoroughly overhauled Winton Six chassis. The bodies are built to order, the complete car, chassis and body ranging in price from $2000 to $3000. Attention is called to the graceful lines and correct proportion of the entire outfit, and the absence of an extreme body overhang, which is due to the 150 in. wheelbase.

The CCJ has most readers because it gives most information

LOWER PRICES ON "Firestone" SOLID TRUCK TIRES

Effective March 8th, 1915

Firestone gives you the tire and method of fastening which insures maximum service under every condition, because it includes every recognized type and size of tire, removable and non-removable, each type refined to highest degree.

Result: A Firestone tire for every road, load and condition of service, so that our expert advises you with an unprejudiced mind.

Firestone service is as extraordinary as the prices in every trucking center. Large and complete stocks are carried, insuring prompt deliveries and careful attention to all tire needs. Telephone our local branch at once for full details and prices on tire equipment for your trucks.

Firestone Net Prices on Solid Tires for Gasoline Trucks

Size	Price	Size	Price
36 x 2	$12.60	34 x 4	$33.20
32 x 2½	17.05	36 x 4	35.10
36 x 2½	18.95	36 x 5	42.95
34 x 3	22.10	42 x 5	49.95
36 x 3	23.30	36 x 6	52.70
32 x 3½	24.55	40 x 6	58.50
36 x 3½	27.35	36 x 7	64.65
		40 x 7	$71.90

FIRESTONE TIRE & RUBBER COMPANY

"America's Largest Exclusive Tire and Rim Makers"

AKRON, OHIO

Branches and Dealers Everywhere

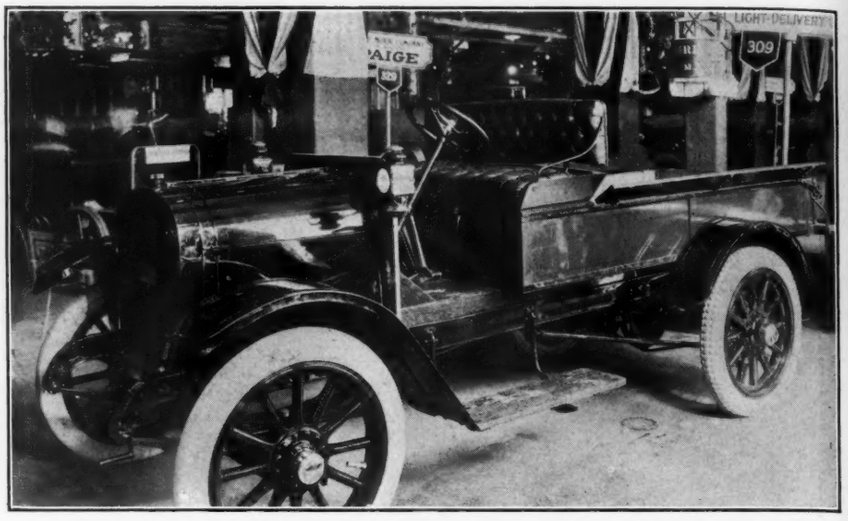
HOWARD LIGHT DELIVERY CAR
Fifteen Hundred Pounds Maximum Capacity—$1000

Robert G. Howard, of 87 Church Street, Boston, is manufacturing and marketing the Howard Light Delivery Car, the same being exhibited for the first time at the Boston Automobile Show. The trucks have been on the market now shortly over a year, in the Boston territory.

General Features

The engine, located under the hood at the front, is a four-cylinder en bloc, 3½x5 Continental, which is well known to our readers. Ignition by high tension Eisemann. Cooling is by thermo-syphon system, using a tubular radiator of large size. Lubrication by a self-contained plunger pump, driven from the camshaft. Power is transmitted through a cone clutch 13½ in. in diameter, with 2 in. face through Spicer universal joint and propeller, to a Covert 3-speed sliding gear, integral with the rear axle. The rear axle itself is of Salisbury manufacture, Hyatt bearings being used throughout this rear construction. The steering wheel is at the left, with center control levers, the gear shift being a ball-topped lever, operating in an H-grid. The brake lever is of the pull type. As the spark is fixed, the only control on the steering wheel is the throttle. The left pedal operates the clutch; the right, the service brake, is a contracting band, fabric faced, on a 14-in. drum, 2-in. face. The emergency brake is of expanding type, operating on the same drum.

The wheelbase is 107 in. Wheel 32 in. with 4-in. Federal Tires, option being given on several makes. The springs are semi-elliptic front, and full elliptic rear, the front being 2 in. x 39 in., shackled at the rear beneath the channel section pressed steel 4½-in. side frame members. The rear springs are 2 in. in width by 35 in. in length, eight leaves below and seven above.



Howard Light Delivery Car, Fifteen Hundred Pounds Capacity, $1,000
Continental Engine, four cylinders, 3½ in. x 5 in., three-speed sliding-gear rear axle. Equipped with pneumatic tires, 32 in. x 4 in. Body of express type, giving a loading space 78 in. long, 42 in. wide

Autocar Ambulance
This compact vehicle was shown at Boston and is based on the regular Autocar truck chassis

Packard Armored Car
Carrying a revolvable turret and rapid-fire gun. The door in front, to protect radiator, can be opened or closed while running, from the seat. Head protection for driver is also adjustable

The radius rods are carried from ball supports at the outer ends of the rear axle, to an adjustable ball carried in a socket member on the under side of the frame. These position the rear axle, and maintain it in proper alignment.

Front axle is I-section, drop forging, with integral spring seats on top. A Ross steering gear is used, with the cross connecting link at the rear of the front axle.

A pressed steel 11-gal. gas tank is located under the seat, feeding by gravity to a Shebler carburetor.

Body Dimensions

The body shown was of the express type, with small flare boards, and had the following dimensions: 78 in. long, 42 in. wide, inside dimensions. The maximum capacity is 1500 lbs. An option on different bodies is given. The car complete with three oil lamps, horn, pump and full kit of tools, sells for $1000 f. o. b. Boston.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

EVANSVILLE BREWING ASS'N. 8 WHITE TRUCKS
THE ATLANTIC REFINING CO. 77 WHITE TRUCKS
JOSEPH HORNE CO.- 36 WHITE TRUCKS
INDEPENDENT BREWING CO. 7 WHITE TRUCKS
NATIONAL CASKET CO. 14 WHITE TRUCKS
FRANK PARMELEE CO. 9 WHITE TRUCKS.
B. ALTMAN & CO. 35 WHITE TRUCKS
CITY of NEW YORK 12 WHITE TRUCKS
AMERICAN CAN CO.-8 WHITE TRUCKS
MANDEL BROS. 17 WHITE TRUCKS
T. EATON CO. Ltd. 14 WHITE TRUCKS
SPEAR & CO. 15 WHITE TRUCKS
GREENFIELD ELECTRIC LIGHT & POWER CO. 10 WHITE TRUCKS
KAUFMANN & BAER CO. 40 WHITE TRUCKS
MARSHALL FIELD & CO. 13 WHITE TRUCKS
GIMBEL BROTHERS
GIMBEL BROTHERS 54 WHITE TRUCKS
THE B.F. GOODRICH CO.- 18 WHITE TRUCKS
THE HIGBEE COMPANY 10 WHITE TRUCKS
ARMOUR & COMPANY 71 WHITE TRUCKS
ATLANTIC ICE & COAL CORPORATION 15 WHITE TRUCKS
STANDARD OIL CO. of NEW YORK 76 WHITE TRUCKS
THE CLEVELAND AKRON BAG CO. 19 WHITE TRUCKS
BOGGS & BUHL 28 WHITE TRUCKS
CHICAGO FIRE INSURANCE BOARD 13 WHITE TRUCKS
W. & J. SLOANE 13 WHITE TRUCKS
TELLING'S ICE CREAM
TELLING BROTHERS CO. 10 WHITE TRUCKS
GULF REFINING CO. 101 WHITE TRUCKS
SOUTHERN EXPRESS CO. 8 WHITE TRUCKS
ASSOCIATED BELL TELEPHONE CO'S 45 WHITE TRUCKS
STERN BROTHERS - 18 WHITE TRUCKS
SAKS & COMPANY 10 WHITE TRUCKS
STANDARD OIL CO. of INDIANA 65 WHITE TRUCKS
THE BELL CO. 12 WHITE TRUCKS
N.Y. BOARD of UNDERWRITERS 14
CITY OF CLEVELAND 17 WHITE TRUCKS
KAUFMANN BROS. 24 WHITE TRUCKS
GLACIER PARK TRANSPORTATION CO. 11 WHITE TRUCKS
CITY of BOSTON 21 WHITE TRUCKS
CITY OF PITTSBURGH 15 WHITE TRUCKS
THE HUB 10 WHITE TRUCKS
SCHULZE BAKING CO. 17 WHITE TRUCKS
BUTTER-NUT BREAD
LOS ANGELES BREWING CO. 13 WHITE TRUCKS
THE MAY COMPANY 11 WHITE TRUCKS
10 WHITE TRUCKS
SUPREME BAKING CO. 16 WHITE TRUCKS
UNITED STATES POST OFFICE DEPT. 28 WHITE TRUCKS
OPPENHEIM COLLINS & CO. 20 WHITE TRUCKS
THE ROSENBAUM CO. 35 WHITE TRUCKS
D.O. SUMMERS CLEANING CO.

This Is Prestige
...that a man buy again

THIS page is a record of White Truck *prestige*. These names familiar for the commercial wisdom they stand for nationally and locally represent purchasers of large fleets of White Trucks.

A good judge of trucks as well as one uninformed may make a mistake in his first truck purchase. But when he continues to buy the same truck again and again as his needs expand . . . the evidence of satisfaction is overwhelming.

Whether you are ready for purchase this year or not . . . permit us to send you illustrated data of White Trucks now in operation built to meet delivery conditions similar to your own.

Exhibiting at the Transportation Building, Panama-Pacific International Exposition, San Francisco.

THE WHITE COMPANY
CLEVELAND
LARGEST MANUFACTURERS OF COMMERCIAL MOTOR VEHICLES IN AMERICA

New York	Broadway at Sixty-Second Street	Pittsburgh	Craig Street and Baum Boulevard	Seattle	1514 Third Avenue
Chicago	2635-2645 Wabash Avenue	Atlanta	63-65 Ivy Street	Memphis	278-280 Monroe Avenue
Philadelphia	216-220 North Broad Street	St. Louis	3422 Lindell Boulevard	Dallas	2025-2027 Commerce Street
Boston	930 Commonwealth Avenue	Washington	1233 20th Street, N. W.	Toronto	14 Alexander Street
San Francisco	Market St. and Van Ness Avenue	New Orleans	750 St. Charles Avenue	Montreal	Forum Building
Baltimore	Mount Royal and Guilford Avenues	Newark	33-35 William Street	Winnipeg	230 Fort Street

When Writing, Please Say—"Saw Your Ad. in the C C J"

AMBULANCE SERVICE: PAST AND PRESENT

By A. JACKSON MARSHALL, Secretary
Electric Vehicle Association of America

ALTHOUGH the chief importance of ambulance service lies in municipal work in time of peace, it originated with war and the present conflict will greatly influence ambulance design. Ambulance service originated in the last decades of the eighteenth century. It had reached a very complete organization in the United States at the time of the Civil War. A Dr. Dalton, who had charge of this service in the Army of the Potomac, inaugurated the present-day city emergency service, at the Bellevue Hospital in New York, in 1869.

Increased rapidity of army movements necessitated the substitution of the motor for the horse in army work. These types are familiar, from the illustrations in the newspapers and pictorial weeklies.

The New Knox Tractor

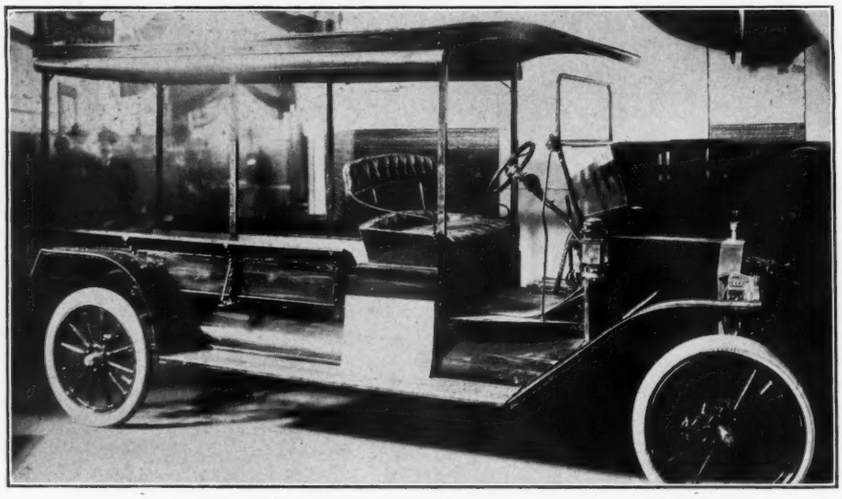
This enormous outfit carries its load largely on steel tires. Capacity, 10 to 12 cu. yds.

Modern Street-Cleaning Methods

Garfords used by the street-cleaning contractors during the recent eight-inch snowfall in New York City.

It is interesting to note that the Encyclopedia Britannica of 1902 shows four horse-drawn ambulances used in England, and an electric of the New York Hospital. The municipal system of New York City care for over 100,000 cases every year. Each hospital has a fined route, to avoid duplicating territory. The *Modern Hospital* states that the first auto ambulance was placed on service about 14 years ago. To-day fifty-one of the one hundred and two ambulances in New York are motors. Horses have been found indispensable, but gas and electric vehicles are steadily coming more and more into use. An example of the division of work is seen in the schedule for Bellevue's equipment. Here there are fourteen horses, three gasoline cars and four electrics which, in 1912, answered 11,700 calls. The horses are held in reserve, the gasoline cars make long runs, and the electrics take first calls, answering probably half the total calls daily and operating chiefly in the immediate neighborhood. Bellevue is the parent of three other hospitals; Gouverneur on the lower East Side, Harlem up-town, and Fordham in the Bronx. Gouverneur and Harlem serve typical city districts with congested streets, good pavements, and short runs. Gouverneur uses two electrics and two horse vehicles and in 1912 these answered 6870 calls. Harlem, with one electric and three horses had 7992 calls. Fordham operates through the outlying districts of the Bronx where there are wide roads, little traffic and fast runs often of 5 miles or more. It therefore uses a gas car and a steamer which, in 1912, responded to 3768 calls.

The New York Hospital has seven auto ambulances, all electrics, one of which has some interesting records. In the Triangle Shirt Factory fire it carried eight patients at one trip to the hospital half a mile off, and on another occasion it made a 50-mile trip to a hospital beyond the city limits on a stormy day with mud in some places up to the hubs. Only an hour's boost was necessary to get the car home. The House of Relief, the down-town branch of the New York Hospital, has one electric and two horse-drawn ambulances. Evident satisfaction in the electric appears from a report of the Superintendent, Dr. Thomas Howell, who concludes: "We find the electric vehicle much more satisfactory than the horse-drawn ones, especially during the hot weather.



Longford Light Delivery

Fifteen hundred pounds capacity; $655, completely equipped. The above vehicle is being marketed by the Longford Company, Holderness, N. H. Ford cars are rebuilt by them, the frame being lengthened, reinforced and fitted with turnbuckle truss rods, the rear axle assembly with propeller-shaft moved backward, giving the vehicle 136 in. wheelbase, and a 3 ft. horizontal, patented shaft and universal-joint construction, inserted on special bearings on new cross-frame members to connect the propeller-shaft with the engine. They are used for all kinds of hauling, from groceries to lumber, and for sightseeing buses and station wagons.

The CCJ has most advertisers because it gives them biggest returns

Kelly-Springfield

TIRES FOR COMMERCIAL VEHICLES

give the most mileage at the least cost per mile. Made in three styles: Demountable, Pressed-On and Sectional Block.

Kelly-Springfield Tire Company

Akron, Ohio

Branches in all Principal Cities

When Writing, Please Say—"Saw Your Ad. in the C C J"

SPRINGS

While the prospective buyer of a car or truck does not, as a rule, make any capital of the appearance of a spring—or any other piece of equipment for that matter—at the same time let any portion of the equipment look rough or unfinished and it immediately creates a feeling of disgust, if not distrust.

The finish of Sheldon Springs is a factor common to all departments which have anything to do with their appearance, and when each Sheldon Spring reaches the finishing department, to undergo the various operations which are carried on there, there is none of the rush, slighting of details, and superficial methods which in many instances have caused American Made Goods to be criticised as lacking in the aesthetic element.

The illustrations show the magnitude of the finishing departments of the Sheldon Axle and Spring Company. At the same time they convey the impression of our tremendous facilities for production, let them also tell you that the finish of Sheldon Springs is in no way sacrificed in order to accomplish the prompt delivery of the tremendous quantity of springs which daily are turned out in the Spring Department of our business.

Truck manufacturers are invited to write for full details and particulars regarding the new Sheldon 1500 lb. Worm Gear Driven Axle, which is now being placed on the market. The characteristics and performance of this axle will be of special interest to all who build or sell light trucks and delivery cars.

The Sheldon Axle and Spring Company specializes in the design and manufacture of worm gear rear axles, front axles, springs and brake and radius rod equipment.

THE SHELDON AXLE AND SPRING COMPANY

MAKERS OF SPRINGS AND AXLES FOR HEAVY DUTY SERVICE FOR MORE THAN 50 YEARS

WILKES-BARRE, PENNSYLVANIA

Chicago: 122 S. Michigan Blvd. San Francisco: 444 Market St. Detroit: 1215 Woodward Ave.

QUESTION—

Has the "Ironclad-Exide" Battery made good?

ANSWER—

More than good.

PROOF—

Here are a few extracts of letters from owners of "Ironclad-Exide" Batteries that have been in service for three years and over. Read them.

SEND FOR THIS BOOK

"Batteries have been in use since the 1st of January, 1912. We must confess we have been surprised by the length of service we have received from them. Two of the batteries are now giving practically the same capacity on discharge as they were when they were six months old."

"We now have 24 "Ironclad-Exide" Batteries, two of which have *been in daily service for forty-one months. We also have three batteries* which are three years old, and three which will have been in service *three years on November 1, 1914.*"

"I have had an unusually fine record with "Ironclad" Batteries. I bought a set three years ago last April. In that time I have gotten close on to 25,000 miles."

"In reply beg to state that the set of "Ironclad" Batteries which *were in my car when purchased in January, 1912, ran 29,700 miles* without one cent of expense for repairs."

"In reference to the "Ironclad-Exide" Battery which I have been using in my Electric for the past three years, will state that this battery has given me exceptional service, and I am told by experts who have recently looked this battery over that it is yet practically as good as new."

"With reference to the "Ironclad" Battery put in our electric truck No. 3, October 4, 1911, will *say that the battery has given satisfaction and is* still in use."

"The "Ironclad-Exide" Battery, 24 cell, which was one of the first that came to this city, which you furnished me in 1910, and which was put into my Electric, was used three years and four months without any repairs or washing, with a total mileage *of about 24,000 miles, and which passed your guarantee* in nice shape."

"More than pleased with the results obtained from this "Ironclad" Battery, having received several thousand miles more out of same than we had looked for."

"We are pleased to state that the "Ironclad" Battery that has been in service in our two-ton van *No. 6 for over forty months has proven very satisfactory."*

The above statements prove that the "Ironclad-Exide" Guarantee is very conservative.

The "Ironclad-Exide" is the most economical battery for Electric Vehicles. Let our office nearest you send you a copy of the "Ironclad-Exide" Testimonial Book, giving the statements of many other users of "Ironclad-Exide" Batteries.

THE ELECTRIC STORAGE BATTERY CO.

Manufacturer of

The "Chloride Accumulator", The "Tudor Accumulator"

The "Exide", "Hycap-Exide", "Thin-Exide" and "Ironclad-Exide" Batteries.

Boston Atlanta Rochester Cleveland PHILADELPHIA, PA. Detroit Chicago Denver San Francisco
New York Washington Pittsburgh 1888-1915 St. Louis Los Angeles Toronto

Your Answer to the Truck Question

It is not improbable that you are facing peculiar problems in the moving of your goods—problems different even from concerns in your own line.

If your work can be profitably done by power vehicles, you will find the *right* answer to your truck question in the GMC line. You may require electric trucks that excel in congested traffic and in relatively short-haul, frequent-stop work. Or if you make fast suburban deliveries you need gasoline machines.

As the only manufacturers of a complete line of gasoline and electric trucks, we can advise you without prejudice as to the truck that will serve you best. We have no bias in favor of worm or chain drive, gasoline or electric power. We are able to supply a truck that fits your business.

If you are facing a delivery or haulage problem—*if it seems reasonable and logical* that the pioneer commercial car builders of America and the only manufacturers of a complete line of gasoline and electric trucks can help you—*then write us today.*

GENERAL MOTORS TRUCK COMPANY

One of the Units of General Motors Co.

Pontiac Michigan

Direct Factory Branches

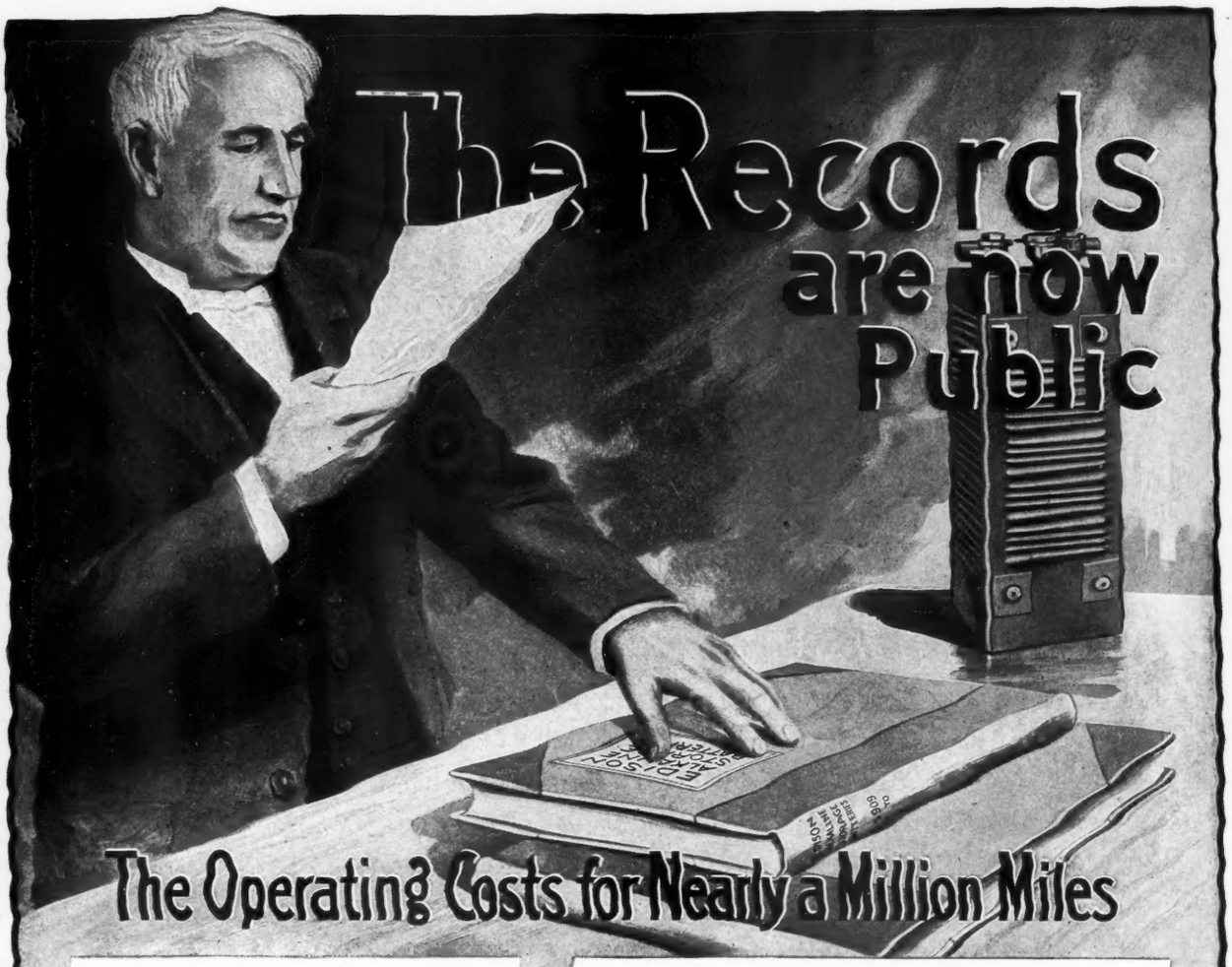
New York Detroit Boston Chicago
Philadelphia St. Louis Kansas City San Francisco

GMC GENERAL MOTORS COMPANY TRUCKS

Gasoline

GMC GENERAL MOTORS COMPANY TRUCKS

Electric

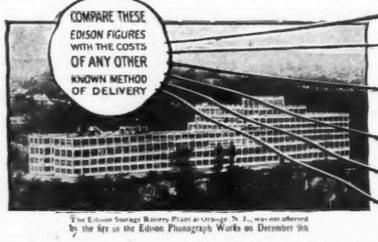


The Operating Costs for Nearly a Million Miles

I CLAIMED that the **New Alkaline Storage Battery** would make the Electric Vehicle the cheapest means of Street Transportation, but I had only my private tests to satisfy me. Today thousands of Edison Batteries in thousands of Trucks and Delivery Wagons are making Operating Records that are easily investigated by all. After the four or five years of hard service that many of these vehicles have had, is it possible to deny that my claim is proved?

Thomas A. Edison

HERE IS ONE RECORD—A REPORT—ON *22 FIVE-YEAR-OLD EDISON BATTERIES*



The Edison Storage Battery Plant at Orange, N. J., as seen reflected in the eye in the Edison Photograph Works on December 9th

Write for Bulletins on the use of **Edison Batteries** for Lighting Country Houses, Ignition and Lighting of Gasoline Cars, Yacht Lighting, Railway Train Lighting and Signaling, Telephone, Telegraph and Wireless *and High-priced or Low-priced Passenger Electrics.*

Edison Storage Battery Company
Orange, New Jersey

Distributors in { New York Chicago Boston Cleveland Washington / San Francisco Los Angeles Portland, Oregon Seattle

ADAMS EXPRESS COMPANY

242 WEST 47TH STREET

MOTOR VEHICLE DEPARTMENT
GEORGE STEVENS
SUPERINTENDENT

NEW YORK, December 7th 1914

Edison Storage Battery Company,
Orange, N. J.

Attention of
Mr. A. Bachman,
V.P.& Genl Mngr.

Gentlemen:-

Thank you for consenting to extend from five to six years the conditions of your guarantee regarding renewal of positive plates.

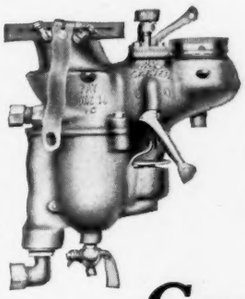
The average operating cost per battery per month of the twenty-two trucks at Indianapolis, equipped with Edison Batteries in November 1909 and averaging about 660 miles per month, is as follows:-

YEAR	BATTERY MAINTENANCE (Refilling, new solution, watering, cleaning, all repairs, inspection, etc.) Material	Labor	CURRENT (Purchased by meter)	TOTAL
1910	$3.47	$4.10	$10.05	$17.62
1911	3.41	4.10	8.93	16.44
1912	3.41	4.10	9.90	17.41
1913	2.86	4.10	8.17	15.13
1914(to Oct.31)	3.11	4.10	9.50	16.17

The average total operating cost per battery per month has, therefore, been $16.55 for a period of five years. In this time the average mileage per truck was about 40,000, which reduces the operating cost to $.02½ per mile. The batteries are still in service.

Yours very truly,
Geo. Stevens
Superintendent

GS:HHW



More Power with Less Fuel

A Carter Carburetor vaporizes your fuel so *thoroughly that every atom delivers* the utmost power. That's why we guarantee the Carter to give 10% higher efficiency than other carburetors. *We are prepared to prove this to* ***you.***

Carter Carburetor

Multiple Jet

You may have the Carter installed for thirty days' trial. If at the expiration of this period you are not getting more power with less fuel, and *wonderfully increased flexibility besides,* you can return the Carter and we will return *the purchase price. Sounds fair, doesn't it?* And it is fair. We are willing to thus stake our reputation on the Carter Carburetor because we know it to be a *highly superior* instrument, believe in it, and back it up with *more than words.*

Any J-M Service Station will make installation. See your dealer today.

Write for booklet

Strength in Excess of Ordinary Needs

J-M Non-Burn Brake Lining is made many times stronger than is considered necessary for ordinary needs. *The* ***surplus strength*** *means* ***absolute dependability,*** when salvation is measured in inches. It means too that J-M Non-Burn is the logical lining for use on truck brakes.

J-M NON-BURN BRAKE LINING

The product of the recognized Asbestos Specialists of the world. Entirely free from perishable materials.

Made from pure, long-fibred Canadian Asbestos strongly reinforced with brass wire. Impervious to water, oil and gasoline. Not only the safest, but the most economical lining. Every inch of the genuine is guaranteed.

Write for booklet

3022

JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT

One Firm
One Service
One Guarantee
back of every
J-M Accessory

H·W·JOHNS-MANVILLE CO·

Akron	Boston	Columbus	Duluth	Kansas City	Minneapolis	Philadelphia	St. Paul	Toledo
Albany	Buffalo	Dallas	Galveston	Los Angeles	Newark, N. J.	Pittsburgh	Salt Lake City	Washington
Atlanta	Chicago	Dayton	Houghton	Louisville	New Orleans	Portland, Ore.	San Francisco	Wilkes-Barre
Baltimore	Cincinnati	Denver	Houston	Memphis	New York	Rochester	Seattle	Youngstown
Birmingham	Cleveland	Detroit	Indianapolis	Milwaukee	Omaha	St. Louis	Syracuse	

THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED Toronto Montreal Winnipeg Vancouver

When the Salesman Says "Continental"

The name "Continental" has a calibre of 42 centimeters. It makes a dent both deep and lasting; and is the most irresistible piece of ordnance in the entire artillery of the up-to-date automobile salesman. It blasts away hesitancy, levels down opposition, scatters doubts, closes the argument finally and for keeps.

CONTINENTAL MOTORS — Power in Every Nation — AMERICA'S STANDARD

Continental Motors

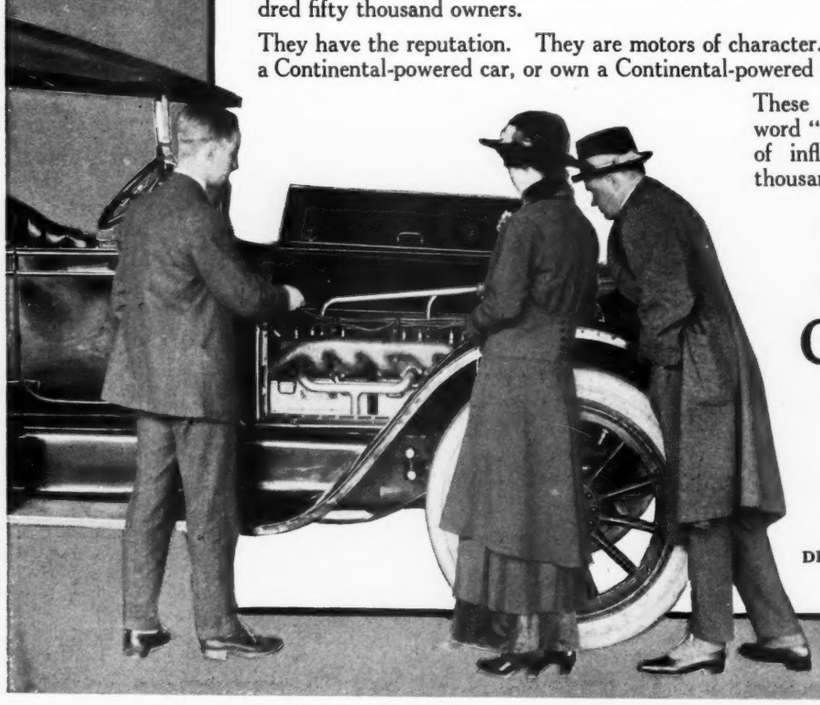
The cars and trucks that are Continental-equipped are getting the business, because they are backed, not alone by the manufacturers' selling force, but by the tremendous prestige of "Continental"—a motor with a world-wide reputation.

They are backed by a power of universal good will—a trade-marked name—that is not excelled by any commodity, at any price, in any country under the sun.

Continental Motors are known to the **buyers** of motor cars and trucks as engines of splendid precision, made of the finest materials, machined to the closest possible limits, and inspected beyond even the remotest chance of flaw.

Better yet, they are known from what they have accomplished in the hands of a hundred fifty thousand owners.

They have the reputation. They are motors of character. Any man is proud to drive a Continental-powered car, or own a Continental-powered truck.



These are reasons why the single word "Continental" carries a weight of influence that swings tens of thousands of sales each year.

Back your cars and trucks with Continental prestige—it pays

Continental Motor Mfg. Company

Largest exclusive motor builders in the world

FACTORIES:
DETROIT MUSKEGON

Used as a Combination Freight and Delivery Truck; Capacity 2-Ton

Read the LARKIN CO. Letter

Gentlemen:—We are glad to comply with your request that we write you our opinion of your trucks.

Two of your 1500 lb. capacity trucks we have maintained in operation since May, 1913; two of your 1½-ton capacity trucks since December, 1913, and 5 of your 2-ton trucks since November, 1914.

This record of our purchase of your trucks is evidence of our confidence in them, and our belief in their possibilities for low net maintenance costs. All of these trucks, except for minor difficulties, have satisfied us and give promise, by their present condition, of continuing to do so for at least a reasonable number of years. We have found the trucks reliable. For the short time we have used them their costs have been moderate and have compared favorably with the costs of similar trucks of comparable capacity of other manufacture.

Our experience has led us to believe that for the amount of investment your trucks have given us maximum returns.

Yours very truly,
LARKIN CO.

Buffalo, Jan. 25, 1915.

Made Standard After Competitive Tests

Larkin Co. not only have standardized Lippard-Stewart Trucks after competitive tests with other cars, but there are over forty other concerns throughout the country who have bought repeatedly after experience with their first Lippard-Stewart. They are serving over 100 different lines of business with delivery cars and motor trucks. You will find a Lippard-Stewart fleet most economical.

Different Capacities for Different Uses

A manufacturer or merchant knows that he wastes much by using a truck of over-capacity. By making up a fleet of Lippard-Stewarts in ½-ton, ¾-ton, 1-ton, 1½-ton, 2-ton sizes, you cut out the waste in operating expense and realize a big saving and great convenience in having only one make of trucks and delivery cars.

Attention given to particular body requirements.

Business Men, Write Us About Your Delivery Problems.

Let us tell you about the Lippard-Stewart trucks, the high business standing of our dealers and the efficiency of our co-operation with owners.

Radiator at Dash, Our Dealers' Sign

½-Ton, ¾-Ton, 1-Ton, 1½-Ton, 2-Ton

We Use

the Continental Motor with Automatic Speed Governor, Eisemann Magneto; Brown-Lipe Transmission; Timken Axles and Bearings; David Brown Worm Drive; Big Size Tire Equipment. A Special Standard of excellence is carried throughout the entire construction.

Catalog and Special Truck Information Sent on Request.

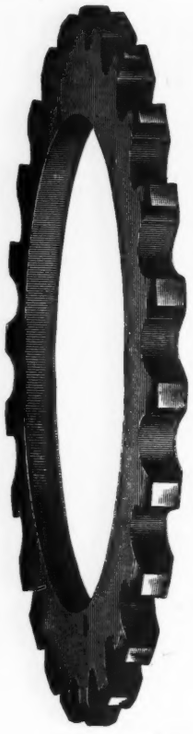
Great Opportunity for Active Dealers in Open Territory. Handle a Complete Line.

Ready Soon { Our ½-ton model will fill the demand for a small-capacity, low-priced Delivery Car that will stand up under hard, fast work. Built like our larger models.

LIPPARD STEWART MOTOR CAR COMPANY

The Pioneers in Worm-Drive for Delivery Cars as well as Trucks.

237 West Utica Street, Buffalo, N. Y.



CULLMAN SPROCKETS and Differentials

in stock and to order.

Send for catalog and let us quote you on your requirements.

CULLMAN WHEEL COMPANY, CHICAGO
1351 GREENWOOD TERRACE

The SPEEDOGRAPH Tells

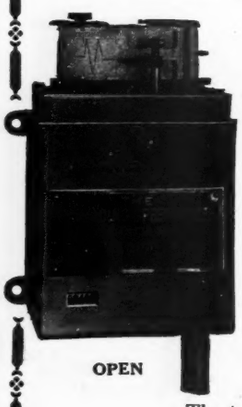
Just What Your Truck Was Doing Every Minute Every Day

Time, Distance and Speed of Every Run
Every Stop and Its Time and Duration
Rate of Speed at any Given Time
Mileage Per Trip, Day or Year

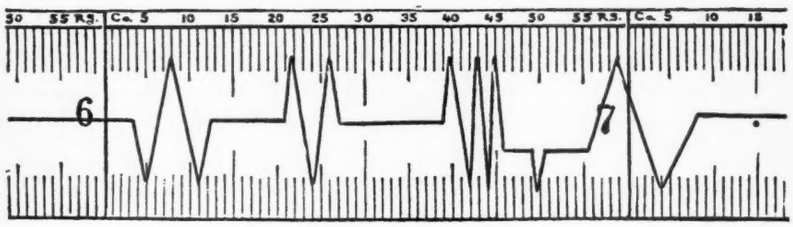
You must have such information to prevent waste and abuse, and to obtain efficient, economic service.

THE SPEEDOGRAPH SAVES

Time — Tires — Gasolene — Repairs — Money



OPEN



Facsimile of Record
Accurate, Clear and Legible

CLOSED

The tape is divided into hours and minutes, and the record line shows every movement of the vehicle.

Write for catalogue and prices

The Speedograph Sales Corporation ***General Distributors*** **No. 11 Broadway, New York**

When Writing, Please Say—"Saw Your Ad. in the C C J"

Your Profit Account

demands that you use a

Veeder

HUB ODOMETER

Little things play a prominent part in creating or destroying profits. In many cases it is only by stopping leaks and paying close attention to details that a profit can be shown.

This particularly applies to motor truck deliveries. It is so easy to waste time, money and gasoline that unless great care is exercised the truck will become unprofitable.

It is because the Veeder enables you to keep accurate track of what your truck and its driver are doing that your profit account needs its installation on your trucks.

The Veeder records with absolute accuracy the exact distance which has been covered. Its record cannot be altered, or falsified without instant detection. It records forward whether the truck moves forward or backward. It affords a check on your drivers which enables you to weed out the inefficient, careless and crooked ones. It enables you to know whether you are getting all the service you should out of your truck and the various guaranteed parts and accessories.

Put a Veeder on each of your trucks and you take an important step toward increasing your profits.

At your dealer's, direct from factory, or the following:

T. H. CRANSTON & CO., 56 E. Randolph St., Chicago
BERNARD I. BILL, 543 Golden Gate Ave., San Francisco, Cal.

The Veeder Manufacturing Company

C. H. VEEDER, President **D. J. POST, Treasurer**
H. W. LESTER, Secretary

Hartford, Conn.

Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Small Die Castings

What's the weakest part of your motor truck—the Springs?

WORM-DRIVE CONSTRUCTION

puts an additional stress on your rear springs — ask your Engineer

TUTHILL TITANIC SPRINGS

Your Safeguard

The Tuthill Titanic Spring is the best construction for motor truck springs because it affords the most positive means of attaching to the axle—it eliminates the possibility of breaking through the center and center bolt shearage—it does away with center motion—it affords the greatest amount of strength with the least possible amount of poundage.

The Tuthill Titanic Spring is the ideal spring for motor trucks with worm drive designed so as to take the brake, thrust and torque through the rear spring—and this means an extra stress which the ordinary spring with a center bolt cannot resist.

Engineers approve Tuthill Titanics

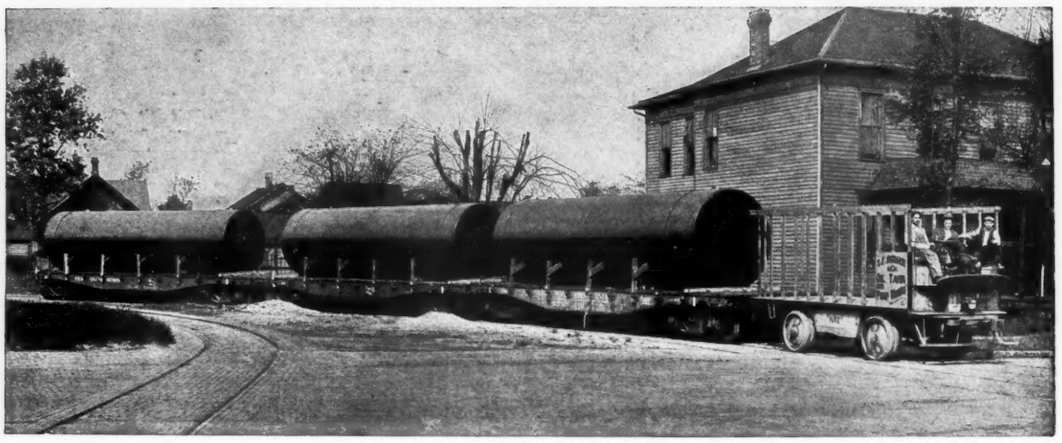
The Engineering Department of the H. E. Wilcox Company has tested and approved the Tuthill Titanic Spring for use on the rear of their 1½ ton worm drive truck, in which the brake, thrust and torque are taken through the rear springs. They adopted the Tuthill Titanic Spring after the old-style center bolt had proved inefficient.

Write at once

to our Engineering Department—no obligation on your part

TUTHILL SPRING CO.

774 Polk Street **Chicago, Ill., U.S.A.**



Gentlemen:—

I am sending you print showing one of your Trucks hauling three cars loaded with 12,000 gallon tanks. I have never had trouble with either of the two trucks in service here. I have always kept them adjusted and well oiled and they run fine. I have pulled seven cars at one time with one truck, four loaded and three empty, which I think is a good test.

Yours truly
JOHN F. DETRO
Operator for
S. F. Bowser Co.

To Users of Trucks: The truck having this record and capacity should interest you because of the big money it will save on your transportation and haulage costs. If it does, let us figure on your requirements.

COUPLE-GEAR FREIGHT-WHEEL CO., 420 Buchanan Ave., Grand Rapids, Mich.

Boston, 541 Tremont Street — New York, 30th Street and 11th Avenue — Philadelphia, 522 Weightman Building

4-Wheel Drive — COUPLE-GEAR TRUCKS — 4-Wheel Steer

"AMERICA'S QUALITY BEARING"

FAFNIR BALL BEARINGS

MADE IN AMERICA
SOLD DIRECT FROM FACTORY
DELIVERIES ASSURED

WHY BUY ABROAD?

ABSOLUTE INTERCHANGEABILITY
MORE SILENT THAN THE "MOST SILENT"
CLOSEST POSSIBLE LIMITS MAINTAINED AND GUARANTEED

SUBMIT YOUR ENGINEERING PROBLEMS. WE ARE IN POSITION TO WORK THEM OUT TO YOUR ENTIRE SATISFACTION. NEW CATALOG READY FOR MAILING

THE FAFNIR BEARING COMPANY, NEW BRITAIN, CONN.

Theres no leak proof ring but the LEAK-PROOF Ring — insist

This is the

The Name LEAK-PROOF Stamped On Every Ring

Piston Ring

Made by McQuay-Norris Mfg. Co.

Its use ensures

Full Motor Power—

Because, being two-piece, expansion openings are sealed and perfectly uniform bearing is obtained on the cylinder wall. This provides proper compression of every fuel charge.

Minimum Carbonization—

Because surplus oil cannot get up into the combustion chamber either through or past the ring.

Service—

Because the ring is made of special Processed Gray Iron of wonderful toughness, that never loses its elasticity and will outlast the motor.

Strength—

Because each section or half is constructed on the principle of the angle-iron—the strongest of all structural forms.

Operating Economy—

Because it makes every drop of fuel count and checks waste of lubricating oil. Being a light-tension ring, it reduces friction loss to a minimum.

Maintenance Economy—

Because it does not wear or score the cylinder and prevents the deterioration of lubricating oil caused by condensed gasoline vapor getting into the crank-case, as happens with ill-fitting piston rings.

Send for FREE Book

"To Have and To Hold Power." It tells all about piston rings and why you should equip your motor with LEAK-PROOF. How it will pay you in fuel economy and prolonged motor life. It's free.

"Ask the User"

In use on over 300,000 motors

Sold by all up-to-date dealers, garages and repair shops.

PATENTED
PISTON RINGS

Avoid imitations and substitution by insisting on LEAK-PROOF

MANUFACTURED BY

McQuay-Norris Mfg. Company

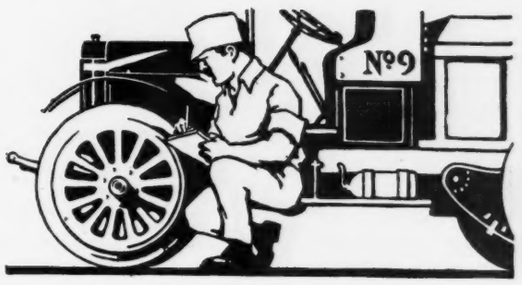
Dept. C, St. Louis, Mo.

CANADIAN FACTORY: W. H. Banfield & Sons, No. 120 Adelaide St. West, Toronto

BRANCH OFFICES:

NEW YORK, 1919-29 Broadway — CHICAGO, 718 Michigan Blvd. Bldg.
PITTSBURGH, 902 Second Nat'l Bank Bldg. — SAN FRANCISCO, 164 Hansford Bldg.
KANSAS CITY, 513 New Nelson Bldg. — LOS ANGELES, 224 Central Bldg.
DALLAS, 1509 Commerce St.

Look for the name LEAK-PROOF stamped on the Ring



Easy to Read

The figures on this Hub Odometer remain stationary—always right side up and easy to read.

The special construction *prevents* oil leaking from axle on to the inside of glass window—the figures are always legible and horizontal to the ground. These are exclusive features of the

TRANSIMETER

(Hub Odometer)

"Dreadnought" Type price, $20.00

"Applied" Type price, $16.50

Other Features

1.—**"Dreadnought" Type guaranteed indestructible.** The heavy cast housing protects mechanism from injury by collision.

2.—"Applied" Type can be fitted to the hub cap of any car or truck.

3.—Positive action—steel pin connection between axle and mechanism.

You Can Save Money by Keeping Mileage Records

Are you getting full distance from gasoline and oil consumed?

Are you getting guaranteed mileage from your tires?

Are the batteries of your electric trucks doing what they should?

Are you getting a full day's work from truck and driver?

These and many other important questions are answered by careful and accurate mileage records. They show leaks which can and should be stopped.

Do you think *your* truck operation has any leaks? Of course you want to find them. Write us for particulars.

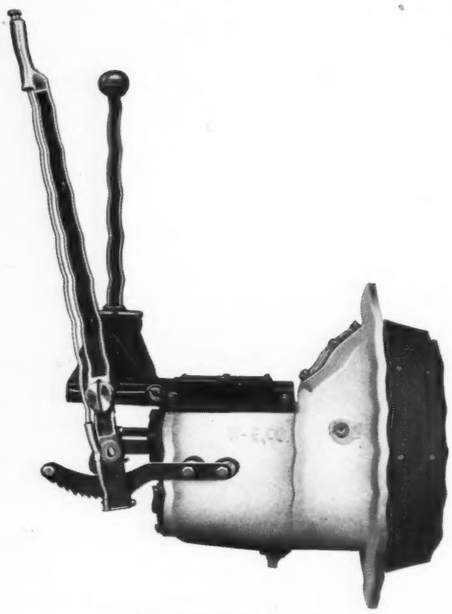
Send for Folder

AMERICAN TAXIMETER CO.

Seventh Ave. & 49th St. New York City

Service stations in the following cities:

San Francisco *New Orleans* *Washington* *Chicago* *Detroit* *Philadelphia* *Seattle* *St. Louis* *Boston*



WARNER GEAR CO. MODEL T38A

The ideal transmission installation for 1500 and 2000 pound worm and internal gear drive trucks

WARNER

"THE RECOGNIZED STANDARD"

MODEL T38A TRANSMISSION
WITH CONE OR DISC CLUTCH

Strong, efficient and dependable, it is right design and Warner Gear Company quality throughout

BLUE PRINTS AND INFORMATION AWAIT YOUR INQUIRY

TRANSMISSIONS
STEERING GEARS
DIFFERENTIALS
CLUTCHES

WARNER GEAR CO.
MUNCIE, IND.

BRANCH OFFICE, FORD BUILDING
DETROIT

BESCO

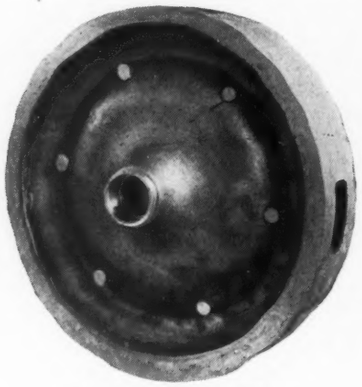
Electric Furnace Castings

We are producing steel castings of highest quality for many leading concerns in the automobile and motor truck industry.

Thin-walled and intricate designed castings made possible by our electric furnace equipment by which we produce superior, hotter and cleaner metal than that secured from fuel melted furnaces.

Worm-Drive Housing for 3 Ton Truck
$\frac{1}{4}$" to $\frac{5}{16}$" Sections
Weight, 185 pounds—36" overall

The electric furnace equipment together with the most modern machinery for the efficient and economical production of steel wheels and castings enable us to make interesting quotations.



32 x 4 Dual Steel Wheel
Brake Drum Cast Integral
Weight, 285 pounds (without tires)

We invite inquiries from responsible automobile and truck makers. Send for catalog and complete data.

Buchanan Electric Steel Co.
Buchanan, Michigan

Spicer Universal Joints

Universally Accepted as the Most Dependable Flexible Connection Known to Motor Car Practice

Oil-Tight Dust-Proof

PARTS INTERCHANGEABLE

Spicer Manufacturing Company
Plainfield, N. J.

Sales Representatives:
K. Franklin Peterson, 122 S. Michigan Blvd., Chicago
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Pyrene
TRADE MARK
FIRE EXTINGUISHERS

"The Most Efficient
Fire Extinguisher Known"

Is recognized by fire engineers as a superior, scientific method of extinguishing dangerous incipient fires wherever they occur—in the home, the factory, the power station, the railway car, the automobile and the motor boat.

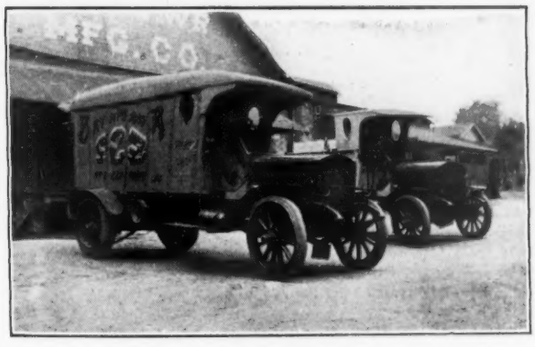
Brass and Nickel-plated Pyrene Fire Extinguishers are included in the lists of Approved Fire Appliances issued by the National Board of Fire Underwriters, and are Inspected, Tested and Approved by and bear the label of the Underwriters' Laboratories, Inc.

At Leading Dealers Everywhere

Write for Literature

The Pyrene Mfg. Co.
1358 Broadway, New York

ROWE MOTOR TRUCKS



are used in every line of business and in every case have proved the most economical means of hauling.

A Rowe Truck will save you money in transporting your merchandise.

The Rowe Truck is guaranteed to give

Continuous Economical Operation

Worm or chain drive. One to five tons capacity

Rowe Motor Manufacturing Co.
Downingtown, Pa.

ROSS Steering and Differential GEARS

will help sell your trucks

They are STANDARD on good motor truck construction

INVESTIGATE

our new complete line of fore and aft steering gears

Enormous bearing surfaces
Perfect lubrication
Best material throughout
Finest workmanship

Built in the largest and newest steering gear factory in the United States.

WRITE FOR CATALOG

ROSS GEAR & TOOL COMPANY
790 Heath St. :: Lafayette, Ind.

No Truck Will Show a Saving Unless It Is Kept in Service.

Motor trucks cannot show saving over horse-drawn vehicles unless they are kept in constant service.

Equip your trucks with long mileage tires and be sure they are demountable.

United States Motor Truck Tires

DEMOUNTABLE

United States motor truck tires may be changed by your own man either in your garage or on the road. They are long mileage tires and the men who have had the longest experience with motor-truck hauling concede them to be the leading tires for motor trucks.

United States Tire Company
Broadway at 58th Street
New York City

B-A-Gramm's Trucks

appeal to the man who has had experience in the use of motor trucks.

To him their quality points, the individual clutch transmission, guaranteed springs, self-starter, etc., mean a definite saving in operating costs.

The full line, 1 to 6 tons, with all its features, is described in our complete catalog, which will be sent you on request.

THE GRAMM-BERNSTEIN COMPANY
Dept. 1 **LIMA, OHIO, U. S. A.**

5-Ton Pierce-Arrow Truck Wins
in severe competitive short-haul test

The Bryn Athyn Stone Company of Furlong, Pa., recently bought a 5-Ton Pierce-Arrow Motor Truck after competitive tests with two other makes on the severest kind of a short haul.

The test was made over a slippery dirt road where the wheels sank deep into the mud. The material hauled was rock, blasted from the quarry.

As the result of a careful comparison of the work of the Pierce-Arrow and two other makes of truck, the Bryn Athyn Stone Company placed their order for the 5-ton Pierce-Arrow, which they have operated with entire satisfaction ever since. We shall be glad to refer any genuinely interested inquirer to this company for further details.

The Worm Gear

All Pierce-Arrow Trucks are equipped with the worm-gear drive, which is a positive guarantee of effective service under the most difficult conditions.

THE PIERCE-ARROW MOTOR CAR CO.
BUFFALO NEW YORK

RYERSON REINFORCED
GLYCO PATENTED SKELETON CONSTRUCTION
BEARINGS

for automobile, motor boat, tractor and stationary gas engines and other machinery where a removable and quickly replaceable bearing is desired.

Finished Bearing

A reinforced Babbitt bearing embodying enormous **strength** and **resistance.** A steel or bronze skeleton embedded in the **Babbitt** changes weakness to strength — just what steel reinforcement does to concrete.

Section showing reinforcement

Reinforced and interlocked throughout body and flanges —skeleton and Babbitt one homogeneous mass.

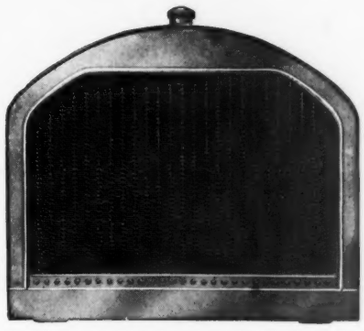
Demand Ryerson Reinforced Bearings in those vital parts of your engine—the connecting rod and main shaft bearing. The whole engine is no stronger than its weakest part. Inferior bearings make an inferior engine.

JOSEPH T. RYERSON & SON
Iron Steel Machinery
Chicago New York St. Louis

Steel or bronze skeleton, used in combination with whatever Babbitt metal is preferred.

CANDLER TRUCK RADIATORS

Thoroughly Reinforced



Unusual Strength—High Efficiency

The Candler Special Truck Radiator is the strongest construction on the market to-day. It is highly adapted to truck use, by virtue of its efficiency, strength and durability, non-leakable and non-freezable features as well as its ease of repair.

We invite correspondence from those interested in a Practical and Serviceable Truck Radiator.

CANDLER RADIATOR COMPANY
DETROIT, MICH.

Watch Your Brakes

When a truck won't run, you lose time. When it won't stop, you are apt to lose the truck. Which is more important?

Keep the truck running by all means—that's what it's for. But don't forget the brake linings.

A lot of brake linings are not reliable. When the outside coating wears off they become worthless—friction-shy.

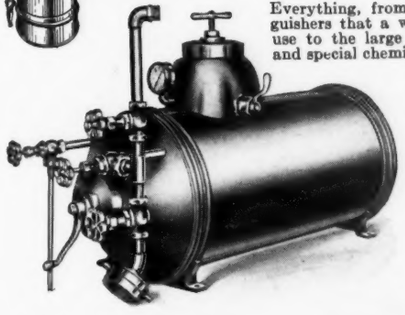
Thermoid
HYDRAULIC COMPRESSED
Brake Lining-100%

Brake lining, to be 100 per cent., must be brake lining all through. Not merely on the outside. It must be trustworthy to the last.

Thermoid retains its 100% gripping power even until worn *paper-thin*. Hydraulic compression makes it one solid, single substance of uniform density clear through—instead of being loose and stringy (and friction-shy) on the inside, as is ordinary woven brake lining. Guard YOUR truck with Thermoid.

Thermoid Rubber Company
TRENTON, N. J.
Our Guarantee: Thermoid will make good—or WE will

DEPENDABLE Chemical Fire-Fighting APPARATUS



Everything, from the hand extinguishers that a woman or child can use to the large Chemical Engines and special chemical tanks for Fire Department service.

Into each is put material and workmanship that cannot be excelled. Designs are shown by actual use to be beyond improvement.

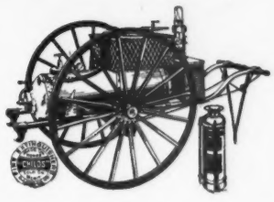
Result: Perfect and immediate action when needed, no deterioration from lack of use or age.

All Our Tanks Are Made of Copper

The name **"CHILDS"** stands for perfection.

Chemical Tanks for Fire Department or other service made to order.

Write for our Complete Catalogue and interesting talk on Fire Apparatus.



O. J. CHILDS CO., Utica, N. Y.
MANUFACTURERS FIRE APPARATUS

DENBY

Motor Trucks

Four models—1500-pound, one ton, one-and-a-half ton, and two tons.

Each model designed not only to carry its rated load, but to carry it with the absolute minimum of strain and wear on the parts.

Compare Denby construction with that of any other truck of the same rated capacity, and you'll understand why "every buyer becomes a booster."

Denby Motor Truck Company
28 Dubois Street, Detroit, Michigan

We shall be glad to correspond with dealers in open territory

Much Depends Upon the Cooling System

Truck buyers are specifying Long Cooling Systems and many truck manufacturers are using them as regular equipment, because they know Long Cooling Systems are the Recognized Standard and cool the motors under all conditions.

LONG COOLING SYSTEMS

differ from ordinary radiators. They are an engineering unit with the motor—designed for the particular motors with which they are to be used.

The Spiral Tube Type for heavy trucks is made with seamless tubing and perfect contacts with the ribbon wound around it. This sturdy construction is exclusive with Long. Other types are Cellular, Flat Tube, Honeycomb and Fin and Tube.

Write for catalogue describing the different types, methods of manufacture, and terms. Let us send an expert to solve your cooling problems.

Long Manufacturing Co.
"Pioneer Makers of Gasoline Engine Cooling Systems"
Detroit, Michigan, U. S. A.

Buy an International Motor Truck

A light truck, for speedy deliveries and light hauling is probably what you will buy, because that's the kind of truck best suited to 80 per cent of business.

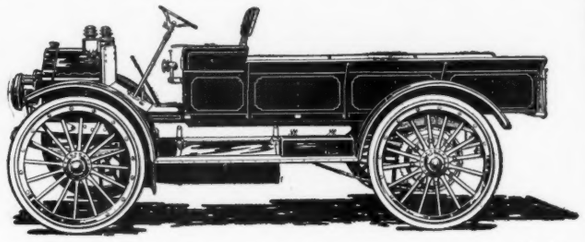
When you come to buy, whatever else you do, get a truck that is made and backed by responsible parties who are likely to stay in business until your truck is worn out. Find out these things about the truck you buy:

1. Is it doing good work for firms in your line of business?
2. What kind of service can you get from the Company?
3. What is the Company's financial standing?

You will get satisfactory answers to all of these questions when you ask about the

International Motor Truck

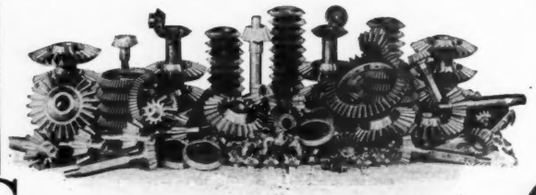
It is doing good work for firms in nearly 200 different lines of business. Service on repairs and parts is the best in the country. Various body styles are available. There is no question about the Company's staying in business and taking care of you until the truck is worn out, even though it should last a lifetime.



There is no safer, better buy for you than an International Motor Truck. Write for catalogues and full information to

International Harvester Company of America
(Incorporated)
182 Harvester Building **Chicago U S A**

—GEARS—



GEARS GEARS

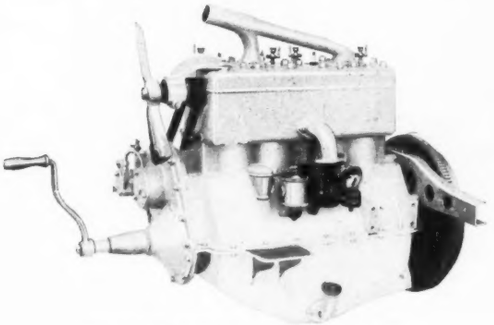
Bevels Mitres Worms
Spurs Spirals Racks
Sprockets

We produce in quantities to specification cut and planed Gears and Pinions of all descriptions. As a source of supply in connection with *Gears* and *Gear Cutting*, we are considered an asset by many of the best interests. They buy from us year after year, because these advantages are afforded:

(1) *Unexcelled facilities.*
(2) *The highest standard of workmanship.*
(3) *Years of experience as specialists in gearing.*
(4) *A most careful selection of materials.*
(5) *Particular attention to deliveries.*

THE VAN DORN & DUTTON CO.
Gear Specialists
CLEVELAND (Sixth City)

—GEARS—

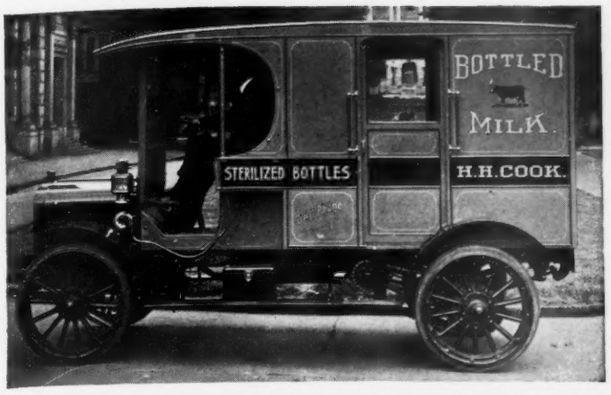


Model 20, 3½ x 5, 4 cyl.—30-35 H. P.
For Trucks of ½-1½ Ton Capacity

THE RUTENBER MOTOR

Model 20 is an entirely new design for 1915. It is a very efficient, high-speed motor, with extra large bearing surfaces and possesses a unique combination of features which appeal strongly to commercial car makers. While this is a motor that embodies the highest grade material and workmanship as has for many years been characteristic of Rutenber products, it is one of simple and plain design that permits of very low quantity prices. We invite your inquiries.

The Rutenber Motor Company
Marion - - Indiana



BESSEMER TRUCK

Illustration shows Model "C" which is equipped with either pneumatic or solid tires. There is more real sturdiness built into this than in any other one-ton truck on the market.

Three Models

MODEL C	MODEL A	MODEL D
1 Ton Capacity	1½ to 2 Ton Capacity	1½ to 2 Ton Capacity Worm Drive
25 H. P.—$1250	30 H. P.—$1800	30 H. P.—$2300

DEALERS: Write us about the special proposition we have for you. The Bessemer line enables you to handle every truck requirement.

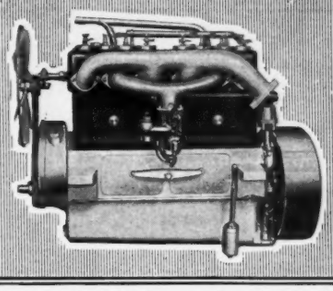
BESSEMER MOTOR TRUCK CO.
GROVE CITY, PA.

MAKE your guarantee of truck efficiency mean what it says. The truck equipped with the Waukesha Long-Stroke Truck Motor fulfills every promise your guarantee makes — because it's a motor with unlimited capacity for hard work — because its strength combats abuse and carelessness and keeps down the upkeep expense to the minimum — because it consumes less fuel than any other motor, and because it's strictly a **truck motor.**

The Waukesha possesses strength to a most unusual degree. The crankshaft is of double-heat treated nickel-chrome steel, with tensile strength of 70 tons. That metal is exclusively our own process. So, too, is the metal from which the Waukesha

WAUKESHA

4¾×6¾" LONG STROKE TRUCK MOTOR



bearings are made — they have greater resistance than Parsons' White Brass. The construction of the motor as a whole has the comparative strength of these two parts.

The truth regarding the Waukesha Motor makes fascinating reading for the truck manufacturer. Ask us!

WAUKESHA MOTOR CO., Dept. A, Waukesha, Wisconsin

PLAIN COMPRESSION
(Patented)

Empress

BRASS AND STEEL

GREASE AND OIL CUPS

WE MANUFACTURE

a full line of Plain, Leather Packed, Ratchet, Marine, Spring Compression, and many other styles of Grease Cups.

Our line of Oil Cups is equally satisfactory and complete.

WIRE LOCK
(Patented)

Catalogue on Application

Bowen Manufacturing Co.
AUBURN, N. Y.

ESTABLISHED 1909 **INCORPORATED 1914**

SIX YEARS OF SUCCESS

The United States Motor Truck Co.

Cincinnati, Ohio

OFFERS A FINE OPPORTUNITY TO DEALERS

GET OUR PROPOSITION

Made in 2, 2½, 3 and 4 ton Capacity

THE correctness of its construction combined with best quality materials and right prices, make the U. S. a splendid value for buyers and a good proposition for dealers.

SPECIFICATIONS AND PRICES ON REQUEST

Stegeman

Special Truck for Country Roads

Made in all sizes up to 3-Ton

We build a **Special** *Truck for Country Road Service,* **narrow (wagon) gauge, high wheels, single tires, enclosed drive, low center of gravity,** *etc.*

The "regular" or wide gauge truck used in cities won't do in *Country service because they can't travel the narrow, soft* bottom, rutty roads satisfactorily or economically.

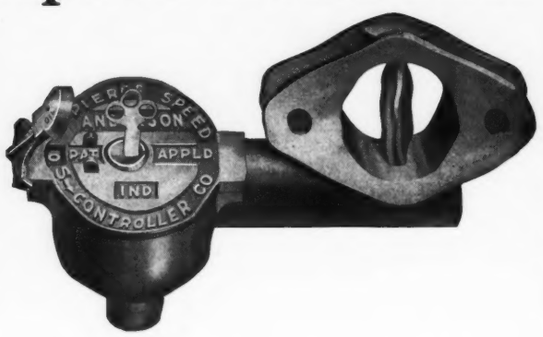
We Make the Truck to Fit the Roads

Brewers, Oil Companies, Bottlers, Dairies, Lumber Dealers, *etc., etc., have been using them for over four years and find them* indispensable. Send for special literature on this truck, full particulars, testimonials and list of users.

AGENTS: There is a large field for this class of machine and you will have no competition. Let us hear from you.

STEGEMAN MOTOR CAR CO.
MILWAUKEE, WIS.

PIERCE
Speed Controller



THE best known, most widely used, most highly efficient product of its kind ever made. Used the country over by leading concerns.

PIERCE SPEED CONTROLLER CO.
Anderson, Indiana, U. S. A.

FORGINGS

We specialize on Drop Forgings and are prepared to give unexcelled quality and service to manufacturers of trucks and automobiles on large or small orders for

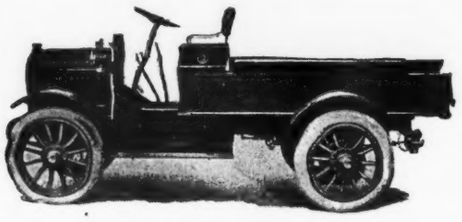
Crank Shafts **I-Beam Front Axles**
Cam Shafts **Connecting Rods**
Levers, etc.

When in need of any of these parts, consult us and let us quote on your requirements before you place your orders.

Western Drop Forge Company
Marion, Indiana

Flint

About 2000 Lbs. Capacity

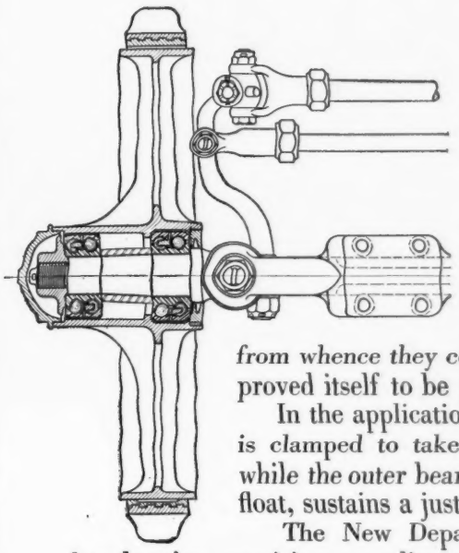


Another Satisfied User

C. E. Brandt & Company, Wholesale Paper and Twine Dealers, Flint, Mich., writes: "Because of the service your 'Flint' Truck has been giving us, we feel you should know how well we are pleased. It is doing the work of two horse-drawn vehicles, sometimes three. In service six days a week without any trouble. Loads run from 1200 to 2000 pounds. Averages 12 miles to gallon gasoline, and 100 miles to gallon oil."

This is the sort of service that is built into all "Flint" Trucks. They satisfy both user and dealer.

FLINT MOTOR WAGON DEPARTMENT
DURANT-DORT CARRIAGE COMPANY, FLINT, MICH.



NEW DEPARTURE BALL BEARINGS

American Made for American Trade

BY reason of their ability to successfully withstand the heaviest of load stresses, regardless of the direction *from whence they come, the New Departure Double Row Ball Bearing has* proved itself to be particularly well adapted for use in heavy truck wheels.

In the application here shown the inner bearing is clamped to take both thrust and radial loads, while the outer bearing with its outer race allowed to float, sustains a just proportion of radial load only.

The New Departure Double Row is a heavy *duty bearing requiring no adjustments. It is superior for service* in motor trucks, and its quality and capacity for long continuous service are absolutely guaranteed.

The Double Row is only one of four types of New Departure Ball Bearings. Write for Catalog descriptive of New Departures in detail.

THE NEW DEPARTURE MANUFACTURING CO.

Distributors in Trade Centers Throughout the United States

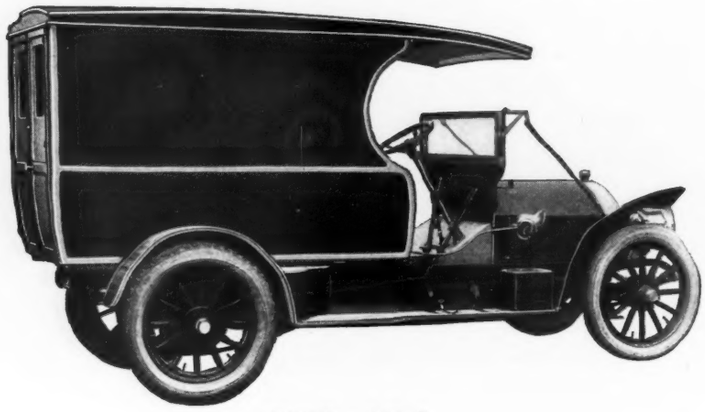
BRISTOL, CONN., U. S. A.

Western Branch 1016-17 Ford Building Detroit, Michigan

Highland Standard Bodies

FOR

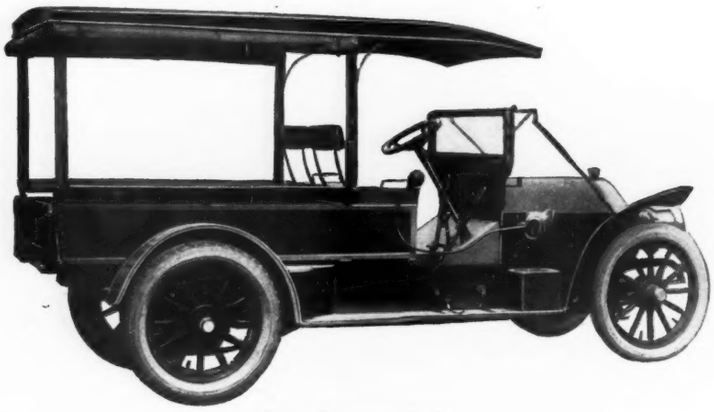
LIGHT CHASSIS



Full Panel Body

We manufacture a complete line of Standard Bodies for Light Commercial Vehicles, which are adaptable for use on touring car chassis.

Having standardized the design, we carry a large stock of bodies and finished material, so are prepared to make prompt delivery on Bodies for every service and to fit any Chassis.



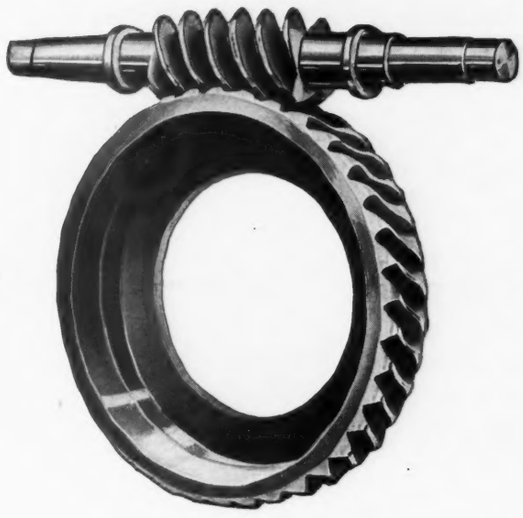
Open Express Body

Send for Catalog No. 10, Light Chassis; Catalog No. 14, Heavy Chassis; Catalog No. 15, Ford Chassis

The Highland Body Manufacturing Co.

Cincinnati, Ohio

The Ultimate Drive



Silent—Efficient

Watch for a Great Announcement

A most interesting report is being made by one of the greatest manufacturers of automobile trucks in America, telling of the results of the expert work we have been doing with this company for the past year and a half on worm drive.

This report will serve to emphasize what is already generally known—that the Cleveland Worm and Wheel is an unrivaled drive for motor vehicles.

There seems to be much surprise at the good points that the worm and wheel is now developing in actual practice.

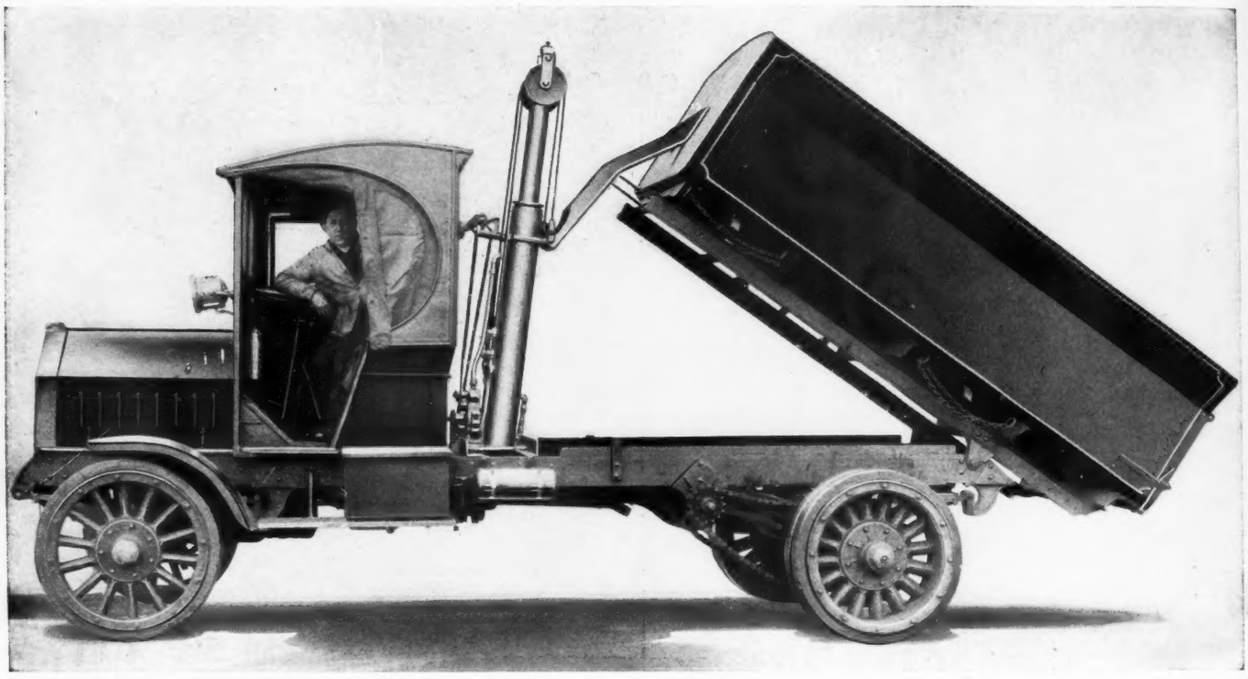
There is no mystery about its strength, silence and power: if a great weight is to be lifted or a house moved it is the worm (jack) that does the work.

The worm is the strongest of all mechanical devices, and there is no need for surprise at its doing its work well and economically.

The Cleveland Worm & Gear Company

Cleveland, Ohio

When Writing, Please Say—"Saw Your Ad. in the C C J"



Latest Type of Wood Hydraulic Hoist During Process of Operation, Showing Body Partly Elevated

AS a product of several years experience in the building of the Wood Hydraulic Hoist, we submit to you our latest and most improved type. During our several years experience as manufacturers of this Hoist, we have been diligently eliminating the weak features until we have a truly high-class product, which we will absolutely guarantee for one year. We especially call your attention to the following features:

Piston rod made of large steel tube, eliminating possibility of bending or breaking.

Pump mounted on base plate, eliminating leaky pipe connections. No piping.

Large pump with steel gears, large hardened and ground pump shafts, running in bronze bushings.

New type of bronze valve cage, fitted with tapered steel valve, with spring tension to hold valve tight at all times.

Case hardened steel clutch of new design.

Large driving chains and sprockets.

We are building two sizes of Hoist. The smaller one for chassis to and including three ton capacity. Larger size on all trucks of more than three ton capacity.

We will be pleased to quote you prices and delivery upon request.

The Hydraulic Hoist Manufacturing Co.

The original builders of Wood Hydraulic Hoist and successors to Wood Hydraulic Hoist Co.

ST. PAUL, MINNESOTA

What Wrong Tires Do

These 1915 Goodyear S-V Truck Tires Overcome

Learn the results of 2,100 actual tests of 1915 Goodyear S-V Truck Tires. See why a growing host of truck owners hails these tires as the conquerors of the road.

Note how they are pressed onto the felloe band—at a minimum of 50,000 pounds.

And this pressure far exceeds any strain possible in service.

Thus the Goodyear S-V Tires end creeping. And they cannot be thrown from the wheel.

They save the cost of heavy metal bands, bolts, wedges and flanges. They end all preliminary work on wheels. No other tire goes on like these—in 5 or 10 minutes—*without a single auxiliary fastening.* Hence they save the expense of carrying excess weight *below the springs*—over thousands of miles.

Wrong Tires Bulge and Break S-V's End This Trouble

No "Lay-Ups" Now

Goodyear S-V Tires end truck tire troubles.

Hence they stop dead losses that accrue when trucks are laid up by wrong tires. The resilient rubber tread, the hard rubber backing and steel channel base are welded into one. Our secret process makes this union last throughout the life of the tire.

Give Extra Mileage

Wrong tires bulge—unnatural displacement soon breaks them.

S-V Tires never do that. For the S-V shape—like an ancient pillar—distributes the heaviest load equally.

And they give you 10% more available tread rubber than most other makes.

Wrong Tires Lay Up Trucks S-V Keeps Them Going

Hence greater mileage and lower cost per tire-mile.

* * *

All makers have striven to solve these baffling problems. Goodyear experts—after 8 years of costly attempts—alone have completely triumphed.

We built, to achieve this, 74 separate truck tire structures in this one type alone. Each overcame some towering obstacle. And the 1915 S-V reaches the summit.

Wrong Tires Creep and Are Thrown. S-V Tires Never

Write for Cost Records

Let us send you full particulars and definite figures from truck users who compared results.

No need to pay the penalty of wrong truck tires. Let the cost book say which tire you shall specify. Address today

GOODYEAR
AKRON, OHIO
S-V Truck Tires

THE GOODYEAR TIRE & RUBBER CO., Desk 94, AKRON, OHIO

Makers of Goodyear Automobile Tires. We Make Demountable, Block, Cushion and Other Types of Truck Tires

(2210)

EISEMANN

Indicative of the determination of the Eisemann Magneto Company to take care of American manufacturers without delay, announcement is made of another increase of the present large factory.

Last summer, long before hostilities broke out in Europe, an increase of more than a third additional space was arranged for. This has just been occupied with full equipment for manufacturing. But with recent developments even this space was insufficient for us to keep up with growing demands. So we have just started upon an even larger increase of manufacturing space and facilities which we will occupy within a very few weeks.

While some of this demand for Eisemann instruments has been occasioned by war conditions, that have not affected our products, the greatest proportion of it is a natural growth as a result of the realization on the part of car makers, of an unquestioned supremacy of Eisemann products from a standpoint of efficiency, durability and dependability.

Additions to Eisemann Factory

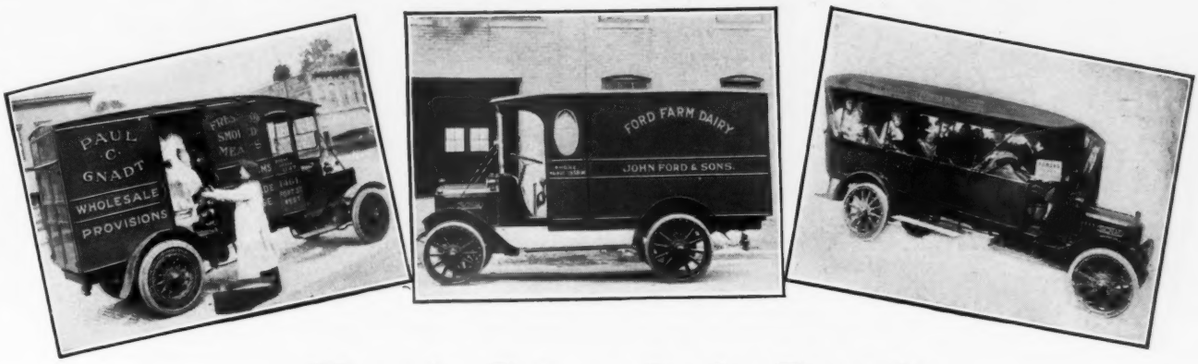
The Eisemann Magneto Co.

Sales and General Offices
32-33d St., Brooklyn, N. Y.

New York 245 W. 55th St. **Indianapolis, Ind.** 415-417 N. Capitol Ave. **Detroit, Mich.** 802 Woodward Ave.

SIGNAL

The SIGNAL Line



Chassis Prices f.o.b. Detroit

One-Ton Chain Drive	***$1400***
One-Ton Worm Drive	***$1500***
One and One-Half Ton Worm Drive	***$1700***

All models furnished in two lengths of wheelbase

This Truck is a Business Builder

This is a mighty important factor to the dealer who is building for permanence. It is more important than immediate profits. A truck may sell because of low price or some fancied advantage only to fall down in the tests of hard usage. The immediate profits are lost in giving free service and repairs while the task of living down the hard feelings and bad reputation is even more costly.

There is no such danger with the SIGNAL. It is a different kind of truck. It is not only built to sell, but is also built to serve. That is important, for a truck that serves faithfully and well is one that creates business for you. Every one on the road is a moving advertisement of SIGNAL quality and efficiency. This is mighty valuable, and the records these trucks make serve to bring new business to your doors. Therefore, a SIGNAL agency means a signal success.

Why is the SIGNAL so successful? First of all—because it is built right. The standard parts used are typical of the construction throughout. Such names as Timken Axles and Bearings, Continental Motor, Covert Transmission, Detroit Springs, Timken-David Brown Worm-Drive Rear Axle, Russel Jack Shaft, Gemmer Steering Gear, Eisemann Magneto, Stromberg Carburetor tell an indisputable story of quality.

Then the capacities—one ton and one and one-half ton—are the easiest to sell. They have the widest application to delivery conditions. The choice of worm or chain drive and two lengths of wheelbase in the one ton, with the worm drive ton and a half, meet practically all requirements.

The SIGNAL sells because its quality and value are readily apparent and its adaptability is the greatest. It builds business because it gives such service that repeat orders and new business are inevitable. The agency for such a truck is profitable now and ***in the future.*** Surely you are sufficiently interested to write us now asking for proof.

Signal Motor Truck Company, Detroit, Michigan

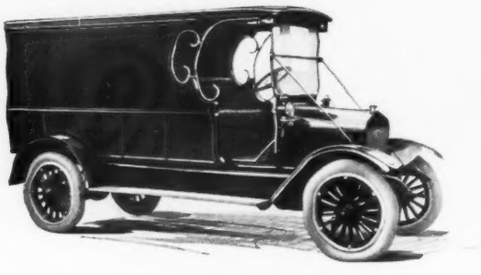
CHASE

"CHASE YOUR DELIVERY"

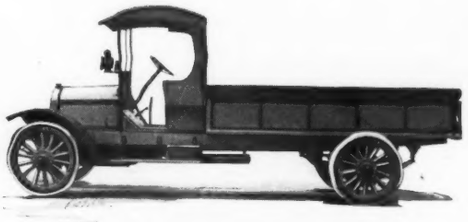
Models T—R—O
Chase Motor Trucks

HERE they are—the new Chase models—the line of least resistance. There's a Chase car to serve every purpose, no matter what the prospect.

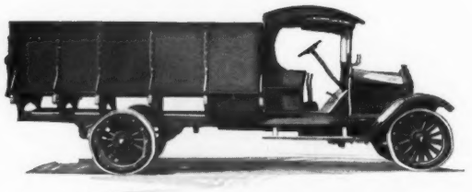
Chase trucks demand the immediate consideration of every wide-awake dealer in the country. Look over these three models. Compare price, capacity, equipment and quality with any other make of power vehicle.



Chase Model "T"—1500 lbs. Capacity
Chassis Price, $1500.00



Chase Model "R"—4000 lbs. Capacity
Chassis Price, $2200 00



Chase Model "O"—7000 lbs. Capacity
Chassis Price, $3300.00

THE FIVE BIG POINTS

1. **Worm Drive—David Brown type, with Sheldon Axles**
2. **Continental Motor**
3. **Hydraulic Pressed Steel Frame**
4. **Brown-Lipe Transmission**
5. **Bosch Ignition**

DEALERS—Let us tell you about the Chase sales policy that does not require heavy deposits or investments. Our plan for dealer co-operation is a new departure in the automobile industry. Write for literature at once.

CHASE MOTOR TRUCK COMPANY
SYRACUSE, N. Y.

5,000 Chase Trucks Now in Service

G. A. Wood—Inventor of the original Wood Hydraulic Hoist, demonstrating his improved and latest invention—the **hoist** with the **large, tubular piston.**

Protected by Patent Law

WOOD Hydraulic Hoist and Bodies

are used by leading truck makers as standard equipment on all dumping outfits.

The illustration shows the latest Improved Wood Hydraulic Hoist and Standard Sand and Gravel Steel Dump Body, as applied to a truck chassis.

You will note at once the clean-cut and integral appearance of the outfit, and the extremely large lifting member or Piston Rod (the Vital Factor) with which it is equipped.

The Wood Hydraulic Hoist and Body Solves the Dumping Problem

Its simplicity, adaptability and efficiency appeal to everyone. *Write for illustrated literature*

"Made in Detroit"

Wood Hydraulic Hoist and Body Company

560 Franklin Street ∴ Detroit, Mich.

Successor to Wood Hydraulic Hoist Co., St. Paul, Minn.

COVERT

TRANSMISSIONS

Specified by Leading Engineers

Many of the most prominent automobile and truck engineers in the country specify Covert Transmissions in their products.

They know from long years of experience that Covert Transmissions give the service they demand from Transmissions.

Because—the design is right—the materials and workmanship are the best, and they are built by an organization that has specialized in building the best transmissions they could make, for fifteen years.

Through many years of hard service, motor car and truck buyers have learned that the word Covert in the transmission specifications means freedom from transmission troubles.

Covert Transmissions are made in a full line of types and sizes and our engineers will gladly confer with you on the adapting of Covert Transmissions to your particular needs.

COVERT MOTOR VEHICLE CO.

Sales Office: Detroit, Mich. **Factory: Lockport, N. Y.**

Wanted! Business Builders

BUSINESS Builders! The future of the truck industry belongs to you. If you figure the future with the present, and build your business on a solid foundation, you will achieve big success.

Dealers who take this farsighted view of the truck business may establish profitable relations with the INTERNATIONAL MOTOR COMPANY, manufacturers of the famous MACK & SAURER motor trucks.

The INTERNATIONAL line is known. The MACK truck has been manufactured and developed for a period of more than 16 years. Successful from the start the MACK today is setting new standards on truck values in every field of motor transportation. The SAURER truck is another recognized leader, representing the best European practice adapted to American conditions.

The INTERNATIONAL line is complete. Capacities are 1, 1½, 2, 3, 5, 6½, 7½ tons — and 10-ton tractor-trailers. The latest models are MACK 1 and 2-ton Worm Drive Chassis, in addition to the present Chain Driven trucks.

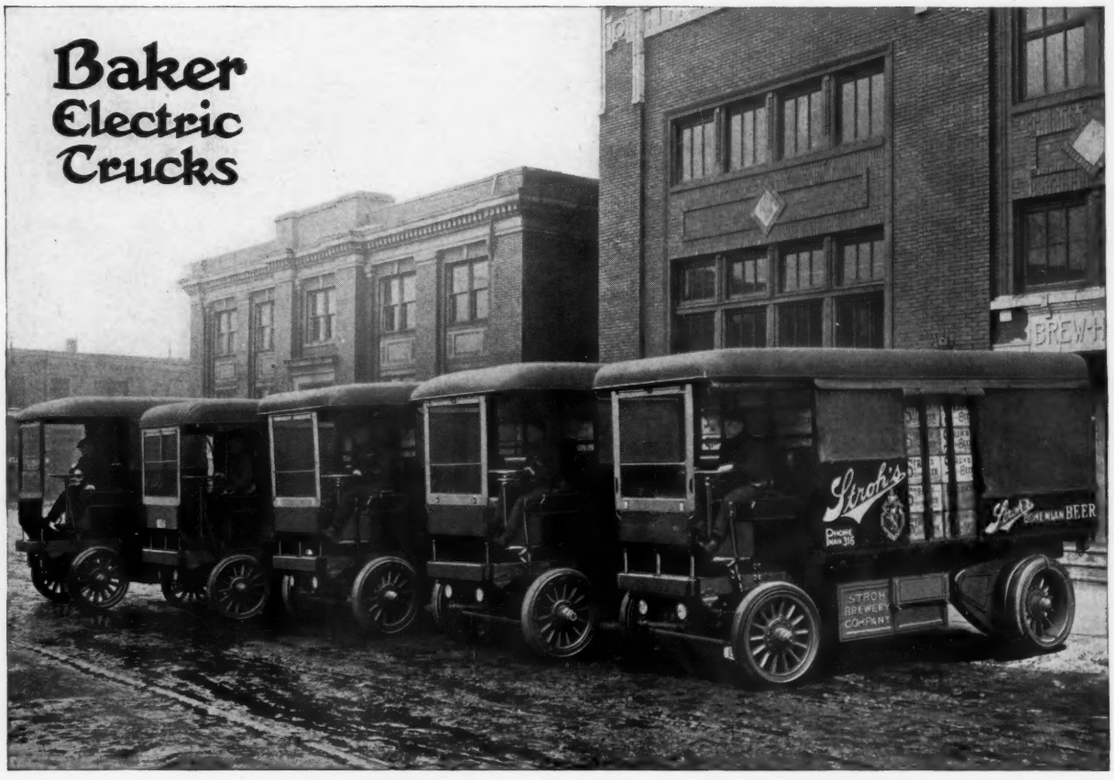
The INTERNATIONAL organization is permanent. INTERNATIONAL selling co-operation is a valuable asset in establishing a business and making it profitable.

Representation in the following cities

New Haven	San Francisco	Richmond
Portland	Seattle	Los Angeles
Philadelphia	Buffalo	Albany
Kansas City	Boston	St. Louis
Jacksonville	Baltimore	Chicago
Washington		Newark

We have some territories still open for agents.

INTERNATIONAL MOTOR COMPANY
64th ST. & WEST END AVE.
NEW YORK CITY



Baker Electric Trucks

are in service in 98 distinct lines of trade in as many different cities located in the United States, Canada, Alaska, England, France, Porto Rico, South America, South Africa, Siam, Japan and Australia. Our Truck catalog shows many of these trucks and gives interesting figures on what they have actually done. May we send it to you?

Capacities: one to five tons.

Body designs to meet any requirement.

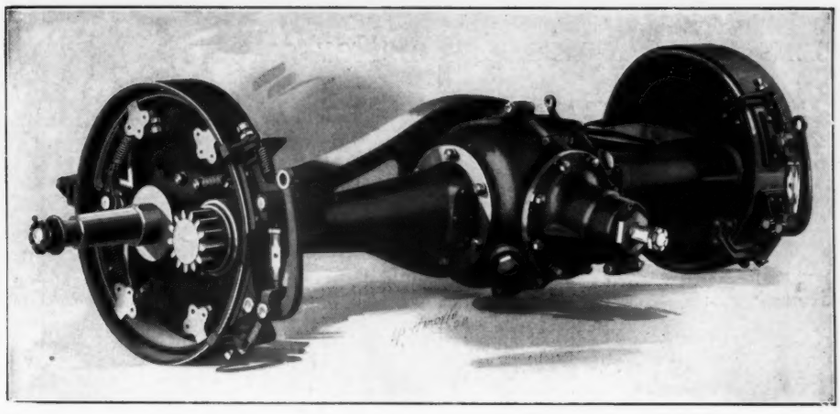
The Baker Motor Vehicle Co., Cleveland

Celfor Axles

INTERNAL GEAR DRIVE

FOR MOTOR TRUCKS

ABSOLUTELY QUIET

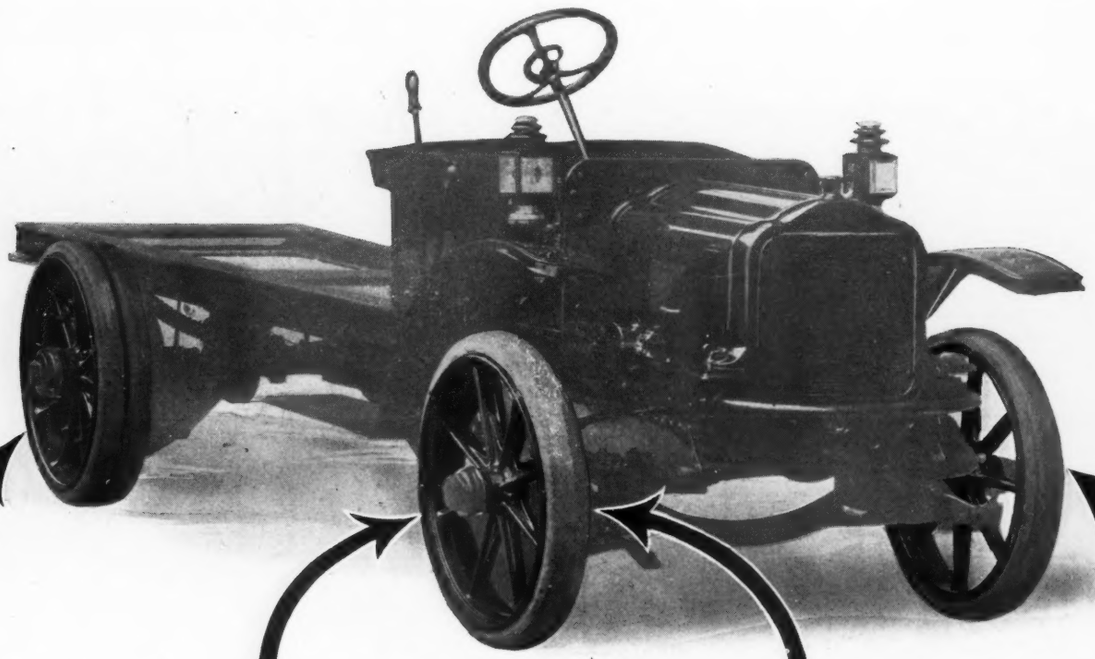


¶ Absolutely quiet—light in weight—efficient.
¶ All working parts enclosed and dust-proof.
¶ Solid axle carries load—live axle transmits power.
¶ Designed for radius rod or spring drive.
¶ Built in capacities from 3/4 to 10 tons.

Send for Complete Illustrated Catalog

Celfor Tool Company

BUCHANAN, MICHIGAN U.S.A.



The trucks you sell will give better service, equipped with

WEST'S CAST STEEL WHEELS

Why? They combine strength and lightness. Weight, 200 pounds less per set on 3-ton cars and 300 pounds less per 5-ton car. These wheels are better than wood, because they last longer, stand more load and strain and cost less (quality considered).

The question of wheels, their strength, weight, ability to carry the load, and durability, is a mighty important one.

A careful study of the question will convince you, as it has many others, that **the final word in wheel construction is found in West's Cast Steel Wheels.** They are lighter than wooden wheels; are **not affected by climatic changes;** will not warp, twist, shrink or loosen; can stand more strain than other wheels and are far more durable. They are cast in one piece and have no joints to open or rivets to break. Any truck equipped with them has reliable, economical, indestructible wheels and will be free from wheel troubles.

Get the proof of these things and then tell the maker of the trucks you sell that West's Wheels ought to be on his truck to increase its ability to serve, to make it more salable to your customers, to make the agency more profitable to you, and to increase the prestige of his product.

Let us put the evidence in your hands.

THE WEST STEEL CASTINGS COMPANY
805-815 E. 70th Street **CLEVELAND, OHIO**

7 reasons why you should specify McGRAW Solid Tires

1. They are guaranteed to stay permanently on the rims—the result of application under hydraulic pressure to the standard European type of steel base construction.

2. In sizes from 4 inches up they contain about 20% more rubber than advertised standard tires. This means greater mileage and durability.

3. Exceptional resiliency and life.

4. E. C. McGRAW TIRES are guaranteed for 10,000 miles—3000 miles more than usual guarantee.

5. The tire profile is so designed that under load, maximum traction surface is secured.

6. They give longer and better service, and are more economical than other designs.

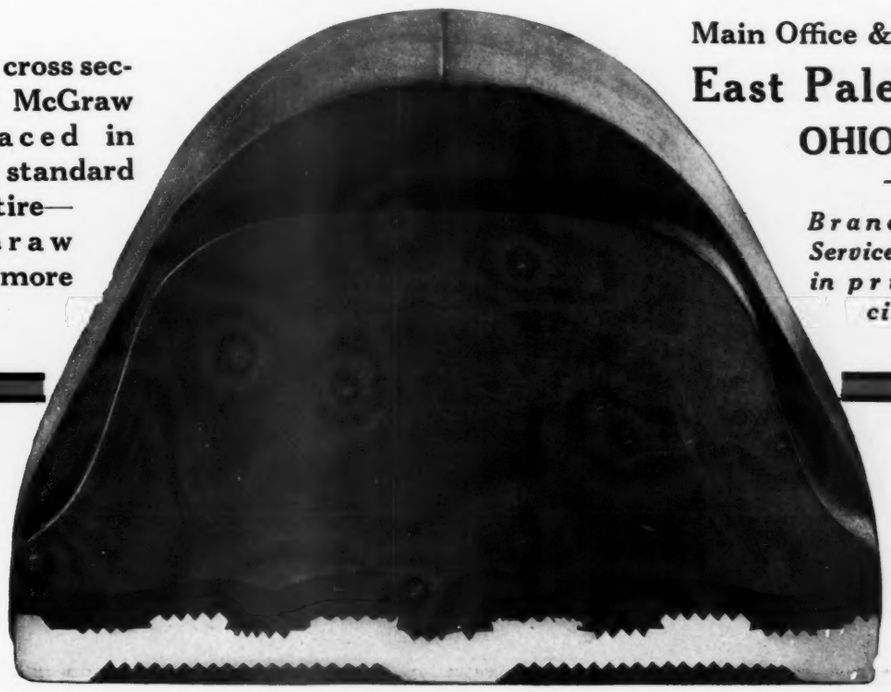
7. All of the above special features, without additional cost per tire, over your present equipment.

The McGraw Tire & Rubber Co.

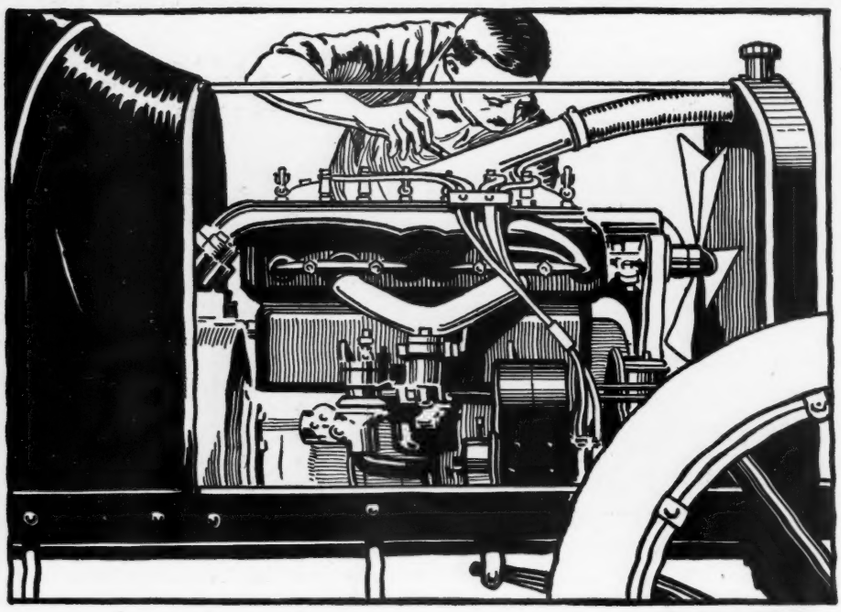
Main Office & Factory
East Palestine, OHIO

Branches and Service Stations in principal cities.

Note this cross section of a McGraw Tire placed in back of a standard S. A. E. tire—the McGraw has 20% more rubber.



When Writing, Please Say—"Saw Your Ad. in the C C J"



NOW

is the time to overhaul your truck.

Even though the car has been idle, Oil may have rotted the rubber in the wires.

Automobile manufacturers in their instruction books show from 65 to 75 places to be lubricated. Oil "creeps" and once it gets to your wiring, there is trouble ahead, for Oil works while you sleep.

This hard-to-locate trouble *can* be avoided.

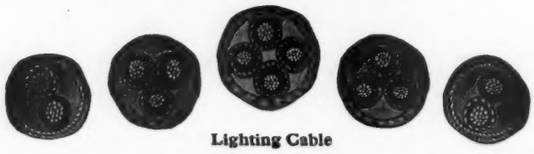
There *is* a cable that resists oil,—it is

Packard

Protected Cable

Use it and get Better Service from your Lighting Dynamo, Starting Motor, Battery and Ignition System, *and* you'll not have to rewire every spring.

Combination High Tension Cable



Lighting Cable

The Packard Electric Co., Dept. H, Warren, Ohio

(110)

Another FEDERAL Endorsement

J. H. THOMPSON, President F. B. THOMPSON Vice President & Treasurer E. S. THOMPSON Secretary

Thompson AUTO COMPANY

DISTRIBUTORS OF MOTOR TRUCKS

SALESROOM AND SERVICE STATION WOODWARD AND HANCOCK AVES

PHONE GRAND 4890

DETROIT

October 12th, 1914.

FEDERAL MOTOR TRUCK RECEIVED OCT 13 1914 GENERAL OFFICES DETROIT MICH

Federal Motor Truck Co.
Detroit, Michigan.

Gentlemen:-

Several years ago when the first Federal was put out on the streets of Detroit it was a success, right from the very start. Every Federal since has been a success, and the large number of Federals that are seen every day working hard and hustling their loads along, is the best evidence of what a really great truck the Federal is and how efficient it has proven itself for different lines of business here.

We have found the Federal a mighty valuable account for us and we can earnestly say that the treatment the Federal Motor Truck Company has given us at every point has been fair and liberal.

The Federal not only saves money for our customers but makes money for us. The first year we took on the Federal we sold thirty, last year we sold over a hundred and this year will do better than ever. The answer lies in the truck itself, it gives the service that brings the repeat orders and makes every owner a booster.

We are strong for the Federal because it is a real truck and because it has behind it an organization that is a pleasure to do business with.

Very truly yours,

Thompson Auto Company

John H. Thompson

J. H. THOMPSON, Pres.
Thompson Auto Co., Detroit, Mich.
Federal Distributors

"The Federal not only saves money for our customers, but makes money for us." That means enthusiastic owners, repeat orders, sales volume and a good, substantial business for you.

The letter opposite could be taken as an expression from any Federal dealer—they are all "strong for" the truck, the company, and the fair and liberal treatment they receive in all Federal transactions.

The Federal Company enjoys an enviable reputation for its financial responsibility and its manufacturing and business policies—it is in the truck business to stay and a dealer handling the Federal is backed up by an organization second to none.

Your success as a dealer is largely governed by the use—service given by your truck and the factory support you receive – the Federal agency for your territory is a very valuable asset in your business.

3½-Ton Worm-Drive Chassis, $2800 f.o.b. Detroit
1½-Ton Worm-Drive Chassis, $1800 f.o.b. Detroit
1½-Ton Chain-Drive Chassis, $1800 f.o.b. Detroit

The addition of the 1½-ton and 3½-ton worm drives to the Federal line gives you even a greater sales opportunity as a Federal dealer.

FEDERAL
MOTOR TRUCK CO.
112-120 LEAVITT STREET
DETROIT, MICHIGAN

The United Line

SPECIFICATIONS

2 Ton Worm Drive Truck $2050.00

MOTOR. Continental. Unit Power Plant, 4⅛ in. Bore by 5¼ in. Stroke.
MAGNETO. Eisemann. Fixed Spark, Water-Proof Type.
CARBURETER. Stromberg. Hot Air Intake.
RADIATOR. Mayo. Wireless. Suspended. Shock-Proof.
TRANSMISSION. Brown-Lipe. Nickel Steel Gears and Shafts.
DRIVE SHAFT. Spicer or Kinsler-Bennett. 2½ in. Tubular.
UNIVERSAL JOINTS. Spicer or Kinsler-Bennett. Metal Cased.
BRAKES. On Rear Wheels Only. Two Sets 17 in. x 2¾ in. Thermoid Lined.
FRAME. Five Inch Structural Steel. None Better Made.
SPRINGS. Perfection. Guaranteed Against Setting or Cracking.
FRONT AXLE. Timken. I Beam Section.
REAR AXLE. Timken-David-Brown Worm Drive. Full Floating.
BEARINGS. Timken. Throughout.
STEERING GEAR. Gemmer. Full Worm and Gear. 20 in. Wheel.
GASOLINE TANK. Welded Steel. 28 Gallons Capacity. Leak-Proof.
TIRES. Solid. 36 in. x 4 in. Front. 36 in. x 4 in. Dual Rear.
GEAR RATIO. 7¾ or 9¼ to 1 on High Gear.
LEFT SIDE DRIVE. Steering Gear on Left Side.
CENTER CONTROL. Gear Shift and Emergency Brake in Center.
WHEEL BASE. 144 inch, Standard.
LOADING SPACE. 120 inch, Standard.
SPEED. Kramer Governor, Limits Speed to Owner's Requirements.
WEIGHT. 4000 pounds.
PRICE. In Priming Coat, $2,050.00 F.O.B. Grand Rapids, Mich.

3½ Ton Worm Drive Truck $2900.00

MOTOR. Continental. Unit Power Plant, 4½ in. Bore by 5½ in. Stroke.
MAGNETO. Eisemann. Fixed Spark. Water-Proof Type.
CARBURETER. Stromberg. Hot Air Intake.
RADIATOR. Mayo. Wireless. Suspended. Shock-Proof.
TRANSMISSION. Brown-Lipe. Nickel Steel Gears and Shafts.
DRIVE SHAFT. Spicer or Kinsler-Bennett. 3 in. Tubular.
UNIVERSAL JOINTS. Spicer or Kinsler-Bennett. Metal Cased.
BRAKES On Rear Wheels Only. Two Sets 18 x 3½ in. Thermoid Lined.
FRAME. Six Inch Structural Steel. None Better Made.
SPRINGS. Perfection. Guaranteed Against Setting or Cracking.
FRONT AXLE. Timken I Beam Section.
REAR AXLE. Timken-David-Brown Worm Drive. Full Floating.
BEARINGS. Timken. Throughout.
STEERING GEAR. Gemmer. Full Worm and Gear. 20 in. Wheel.
GASOLINE TANK. Welded Steel. 28 Gallons Capacity. Leak-Proof.
TIRES. Solid. 36 x 5 in. Front. 36 x 5 in. Dual Rear.
GEAR RATIO. 10⅓ to 1 On High Gear.
LEFT SIDE DRIVE. Steering Gear on Left Side.
CENTER CONTROL. Gear Shift and Emergency Brake in Center.
WHEEL BASE. 144 inch, Standard.
LOADING SPACE. 12 ft. 1 in., Standard.
SPEED. Kramer Governor, Limits Speed to Owner's Requirements.
WEIGHT. 6800 pounds.
PRICE. In Priming Coat, $2,900.00 F. O. B. Grand Rapids, Mich.

The United Motor Truck Company combines, under one managerial roof, the Engineering, Production and Executive skill and brains of five motor Truck organizations.

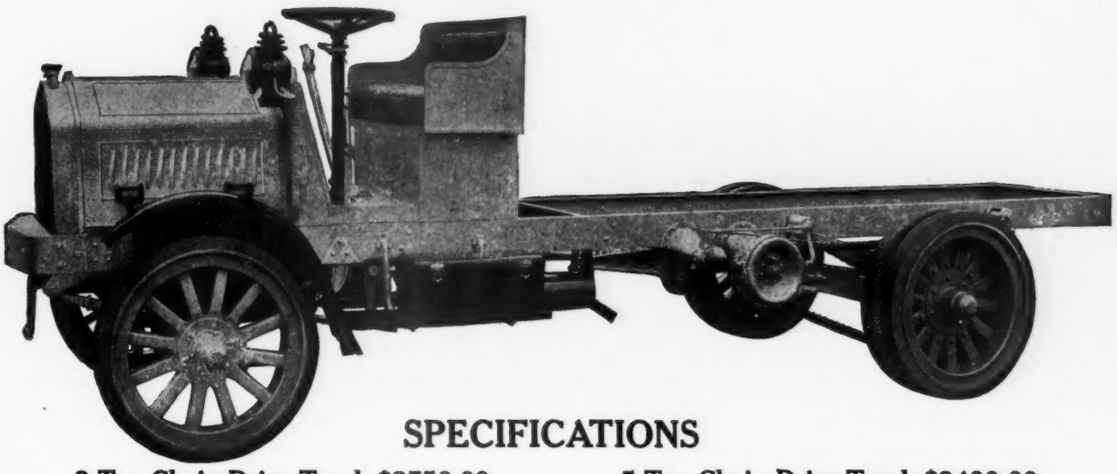
FACTS The United Line is the achievement, the last, best and mature work of motor truck engineers, whose instructions were to produce the best medium and heavy duty motor-propelled, commercial vehicles, money could build. No expense has been spared. With practically unlimited capital at their disposal, exhaustive experimental work gives to the business world, an efficient, economical and dependable motor truck.

The 2 and 3½ ton worm drive trucks actually drive, handle and ride with the ease and grace of a high-grade touring car, even though truck for truck, the United Line is heavier than contemporary trucks. Vibration is reduced to a point where the trucks are quiet, sweet-running vehicles. With a maximum load, a United Truck will throttle down to three miles an hour on direct drive, on really bad roads. Their performance in sand and on hills exceeds motor truck requirements. Engineers of world-wide prominence, state without reservation, "your trucks stand head and shoulders above any trucks built". A demonstration convinces the most skeptical. In the United Line, carbon steel gives way to nickel-chrome, silico-manganese and alloy steels of the very highest quality. Springs, spring bolts and spring clips are exceptionally heavy and of the best steel for the purpose procurable. No detail has been overlooked and the fortunate dealer handling the United Line has a truck several years ahead of present day competition. A truck the keen business man takes to, as its merit is obvious. The combination of parts making the United Line are well known to all, the best money can supply. If it were possible to make better parts the United Line would procure them. In reading this advertisement, bear in mind this is no idle talk, rather a combination of facts. If you want to sell trucks, look into the merits of the United Line, quick, and arrange with us for our District Sales Manager to call on you.

The United Line will always be well up among the better trucks for just a little less money. The United Line should be your line if you are in open territory and wish to make motor truck sales. Act now, write or wire today. All inquiries handled in the order in which they are received.

UNITED MOTOR TRUCK CO. Grand Rapids Michigan

The United Line



SPECIFICATIONS

3 Ton Chain Drive Truck $2750.00

MOTOR. Continental. Unit Power Plant, 4½ in. Bore by 5½ in. Stroke.
MAGNETO. Eisemann. Fixed Spark. Water-Proof Type.
CARBURETER. Stromberg. Hot Air Intake.
RADIATOR. Mayo. Wireless. Suspended. Shock-Proof.
TRANSMISSION. Brown-Lipe. Nickel Steel Gears and Shafts.
DRIVE SHAFT. Spicer or Kinsler-Bennett.
UNIVERSAL JOINTS. Spicer or Kinsler-Bennett. Metal Cased.
BRAKES. Two Sets. Service on Jack-Shaft, Emergency on Rear Wheels.
FRAME. Six Inch Structural Steel. None Better Made.
SPRINGS. Perfection. Guaranteed Against Setting or Cracking.
FRONT AXLE. Timken. I Beam Section.
REAR AXLE. Timken Rectangular Drop Forged.
JACKSHAFT. Full Timken Unit.
BEARINGS. Timken. Throughout.
STEERING GEAR. Gemmer. Full Worm and Gear. 20 in. Wheel.
GASOLINE TANK. Welded Steel. 28 Gallons Capacity. Leak-Proof.
TIRES. Solid. 36 x 5 in. Front. 36 x 5 in. Dual Rear.
GEAR RATIO. Depends on Working Conditions (Optional).
LEFT SIDE DRIVE. Steering Gear on Left Side.
CENTER CONTROL. Gear Shift and Emergency Brake in Center.
WHEEL BASE. 144 Inch. Standard.
LOADING SPACE. 12 ft. 1 in., Standard.
SPEED. Kramer Governor, Limits Speed to Owner's Requirements.
WEIGHT. 6000 pounds.
PRICE. In Priming Coat, $2,750.00 F. O. B. Grand Rapids, Mich.

5 Ton Chain Drive Truck $3400.00

MOTOR. Continental. Unit Power Plant, 4½ in. Bore by 5½ in. Stroke.
MAGNETO. Eisemann. Fixed Spark. Water-Proof Type.
CARBURETER. Stromberg. Hot Air Intake.
RADIATOR. Mayo. Wireless. Suspended. Shock-Proof.
TRANSMISSION. Brown-Lipe. Nickel Steel Gears and Shafts. (Heaviest Type.)
DRIVE SHAFT. Spicer or Kinsler-Bennett.
UNIVERSAL JOINTS. Spicer or Kinsler-Bennett. Metal Cased.
BRAKES. Two Sets. Service on Jack-Shaft, Emergency on Rear Wheels.
FRAME. Seven Inch Structural Steel. None Better Made.
SPRINGS. Perfection. Guaranteed Against Setting or Cracking.
FRONT AXLE. Timken. I Beam Section. (Heaviest Type.)
REAR AXLE. Timken. Rectangular Drop Forged. (Heaviest Type.)
JACKSHAFT. Full Timken Unit. (Heaviest Type.)
BEARINGS. Timken. Throughout.
STEERING GEAR. Gemmer. Full Worm and Gear. 20 in. Wheel.
GASOLINE TANK. Welded Steel. 28 Gallons Capacity. Leak-Proof.
TIRES. Solid. 36 x 5 in Front. 40 x 6 in. Dual Rear.
GEAR RATIO. Depends on Working Conditions. (Optional).
LEFT SIDE DRIVE. Steering Gear on Left Side.
CENTER CONTROL. Gear Shift and Emergency Brake in Center.
WHEEL BASE. 144 Inch, Standard.
LOADING SPACE. 12 ft. 1 in., Standard.
SPEED. Kramer Governor, Limits Speed to Owner's Requirements.
WEIGHT. 6600 pounds.
PRICE. In Priming Coat, $3,400.00 F. O. B. Grand Rapids, Mich.

Coming or going, all trucks in the United Line look alike, they are alike. All radiators have the same curvature. The hoods, seats, dash and cowl assembly are identical on all trucks in the United Line. Wheels are the same diameter, fenders are identical on all trucks. Frames are all of structural steel. Even to the steering group and the lever assembly, all look alike and from point of materials, are alike, the only difference being in weight. A dealer possessing a United demonstrator, or display truck, can show the entire line in any one truck of the United Line, the sole difference in the trucks of two, three or five ton capacity, being in weight of materials used.

FACTS

The striking features of the United Line are simplicity and strength. Take, for instance, the springs used in the United Line. The rear springs look much heavier, and they are, they weigh more, in addition to being made of Silico-Manganese steel, have a tensile strength of more than 200,000 pounds to the square inch. Thus in reality, while our springs look big and heavy, they are twice as strong as they look. A part of such and such a diameter or dimension will do the work theoretically, and it will do its expected work for a long time, yet consider the additional life, extra materials in weight, and quality gives to a motor truck. Crystallization is overcome, is eliminated.

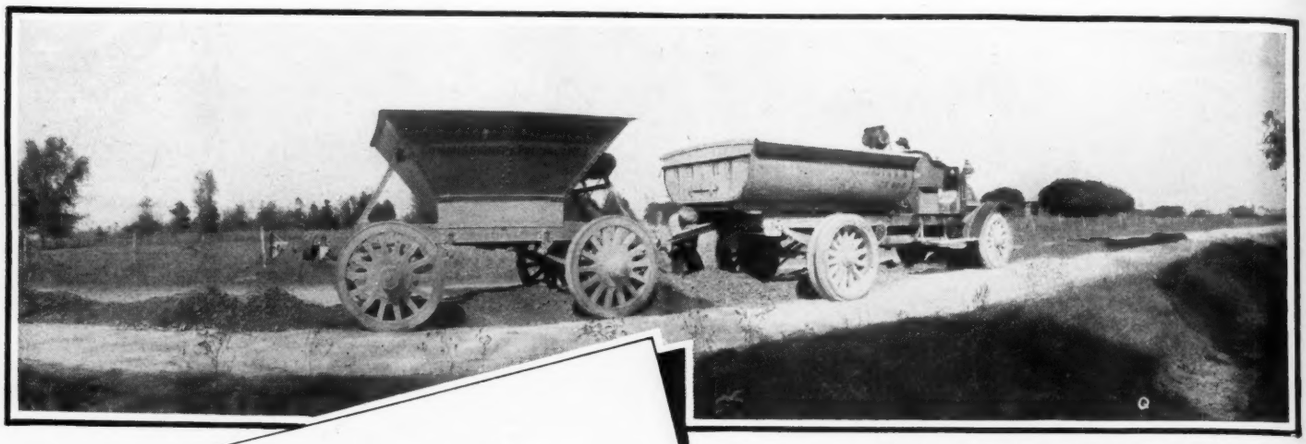
Thus, our great, heavy springs enable us to eliminate torque and drive rods, to simplify rear construction, to cut down working parts, an extra universal joint, to build a two unit truck. The power plant and transmission being one unit and the rear axle being the second, connected by the driving, or propeller shaft.

Proper balance of chassis and rear springs designed to lie flat and work above and below center driving line of springs in loaded position, gives to the United Line, trucks whose engine shaft and propeller shaft operate through and on the same center line when under load. Thus maximum efficiency is obtained.

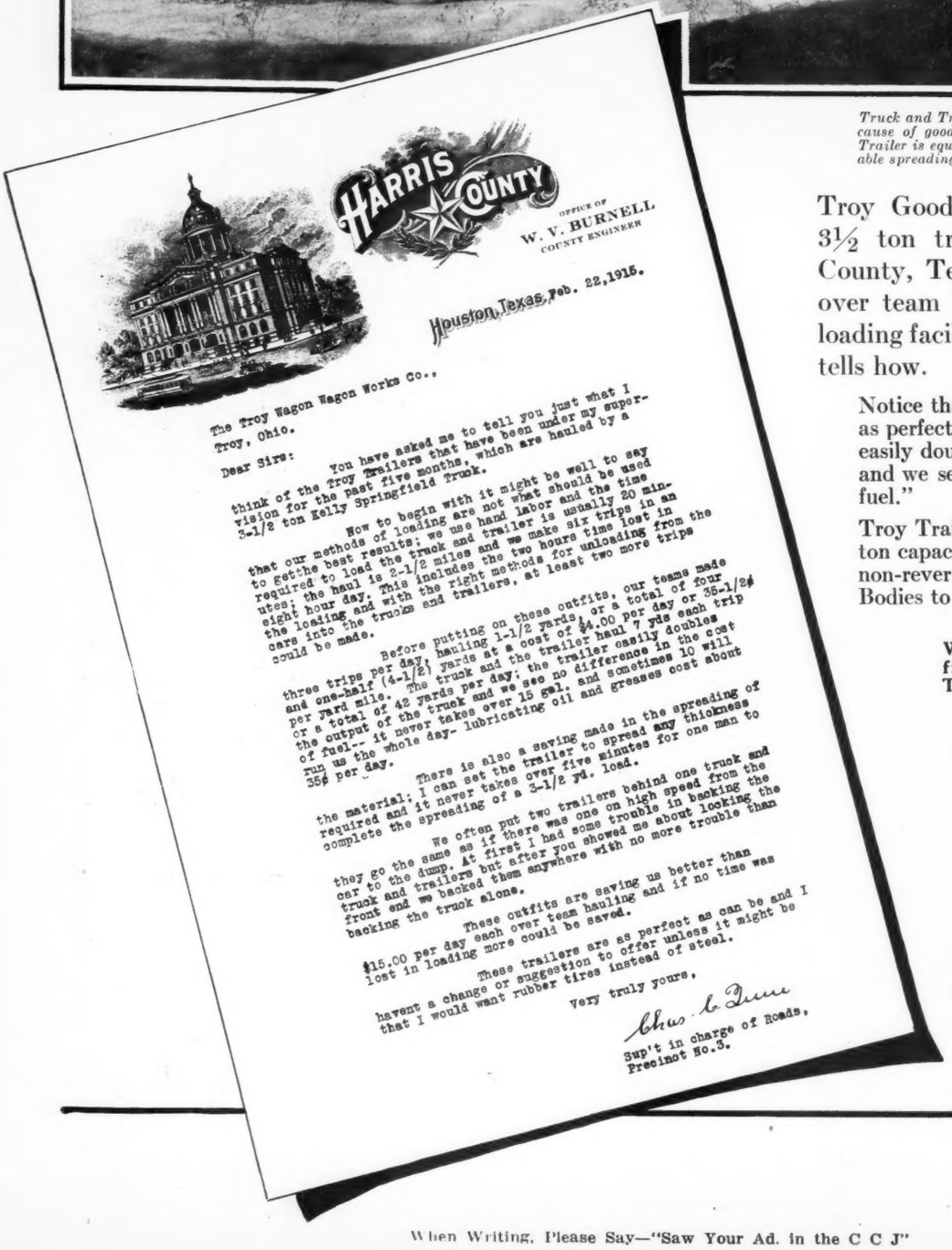
The foregoing features spell success for the truck purchaser, the dealer and the United Line. Are you in open territory, do you want a real dealer's proposition, do you want to sell a truck that you can turn over to the prospect and tell him to go as far as he likes, one that the prospect can demonstrate to himself? If so, wire, write or telephone the factory quick and arrange for a territorial sales manager to call.

UNITED MOTOR TRUCK CO. Grand Rapids Michigan

MAKING GOOD IN MAKING GOOD ROADS



Truck and Troy Trailer doing real work for the cause of good roads, in Harris County, Texas. Trailer is equipped with cross-dumping controllable spreading doors.



HARRIS COUNTY

OFFICE OF
W. V. BURNELL
COUNTY ENGINEER

Houston, Texas, Feb. 22, 1915.

The Troy Wagon Wagon Works Co.,
Troy, Ohio.

Dear Sirs:

You have asked me to tell you just what I think of the Troy Trailers that have been under my supervision for the past five months, which are hauled by a 3-1/2 ton Kelly Springfield Truck.

Now to begin with it might be well to say that our methods of loading are not what should be used to get the best results; we use hand labor and the time required to load the truck and trailer is usually 20 minutes; the haul is 2-1/2 miles and we make six trips in an eight hour day. This includes the two hours time lost in the loading and with the right methods for unloading from the cars into the trucks and trailers, at least two more trips could be made.

Before putting on these outfits, our teams made three trips per day, hauling 1-1/2 yards, or a total of four and one-half (4-1/2) yards at a cost of $4.00 per day or 35-1/2¢ per yard mile. The truck and the trailer haul 7 yds each trip or a total of 42 yards per day; the trailer easily doubles the output of the truck and we see no difference in the cost of fuel-- it never takes over 15 gal. and sometimes 10 will run us the whole day- lubricating oil and greases cost about 35¢ per day.

There is also a saving made in the spreading of the material; I can set the trailer to spread any thickness required and it never takes over five minutes for one man to complete the spreading of a 3-1/2 yd. load.

We often put two trailers behind one truck and they go the same as if there was one on high speed from the car to the dump. At first I had some trouble in backing the truck and trailers but after you showed me about locking the front end we backed them anywhere with no more trouble than backing the truck alone.

These outfits are saving us better than $15.00 per day each over team hauling and if no time was lost in loading more could be saved.

These trailers are as perfect as can be and I havent a change or suggestion to offer unless it might be that I would want rubber tires instead of steel.

Very truly yours,

Chas. L. Quinn

Sup't in charge of Roads,
Precinct No. 3.

Troy Good Roads Trailers behind 3½ ton trucks are saving Harris County, Texas, $15.00 a day each over team hauling in spite of poor loading facilities. Mr. Quinn's letter tells how.

Notice that he says "These Trailers are as perfect as can be" and "The Trailer easily doubles the output of the truck and we see no difference in the cost of fuel."

Troy Trailers are 5 ton, 2½ ton and 1½ ton capacity. Larger sizes, reversible or non-reversible. Rubber or steel tires. Bodies to suit various needs.

Write for Booklet No. 4 CJ, the first ever published on the use of Trailers.

Don't Pile it,
Pull it—in a TROY.

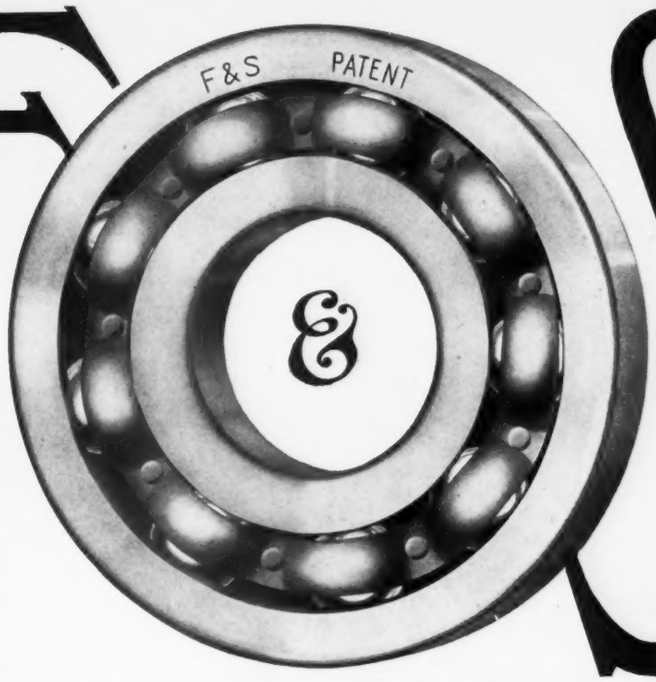
The Troy Wagon Works Company

Troy, Miami County, O.

New York, 50 Church Street
Philadelphia, 702 Abbott Bldg.
Detroit, 319 Hammond Bldg.
London, Eng., 49 Pall Mall

King of the Movies

F & S



Ball Bearings

CONTINUOUS PERFORMANCE SIMULTANEOUSLY ALL OVER THE WORLD

APPROVED BY ENGINEERING BOARD OF CENSORS

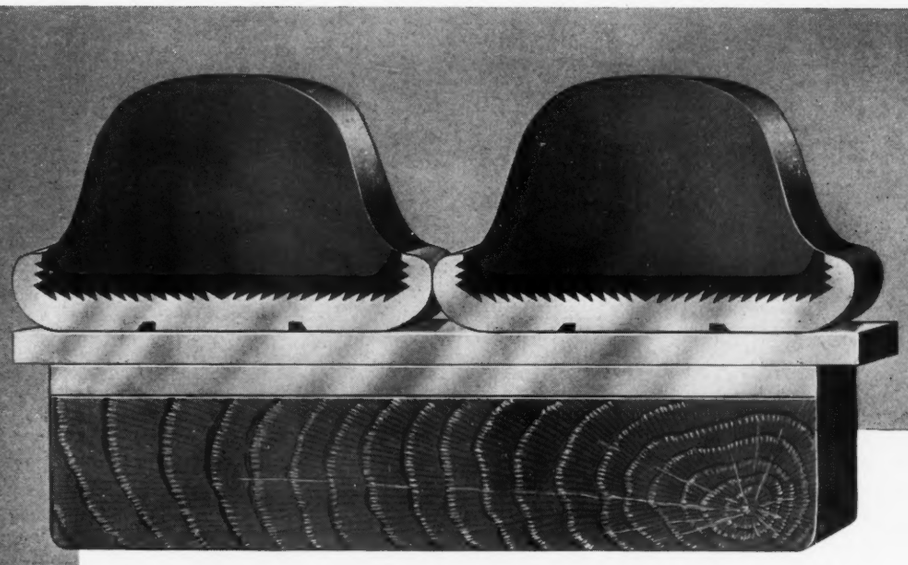
PRESENTED BY

THE BEARINGS COMPANY OF AMERICA

F & S Ball Bearings

250 West Fifty-fourth, New York

When Writing, Please Say—"Saw Your Ad. in the C C J"



GIBNEY
PRESSED-ON
WIRELESS TIRES

Motor truck users find in the two types of Gibney Wireless Tires shown on this and the following page the ideal tires for economical and long-continued service.

The name Gibney stands for quality. There never has been and never will be any cut in quality and size. Value cannot be judged by price only. Quality is the standard by which all cost should be reckoned. Using that as a basis, Gibney Tires stand supreme—in a class by themselves.

The superiority of Gibney Tires for the users is not merely a matter of belief, a claim or any other indefinite, intangible thing. It is a proved fact. The verdict has been rendered by the court of public opinion, composed of truck users who care not for names or makes, but for keeping down operating costs. Their experience offers conclusive proof why Gibney Tires should be on your trucks.

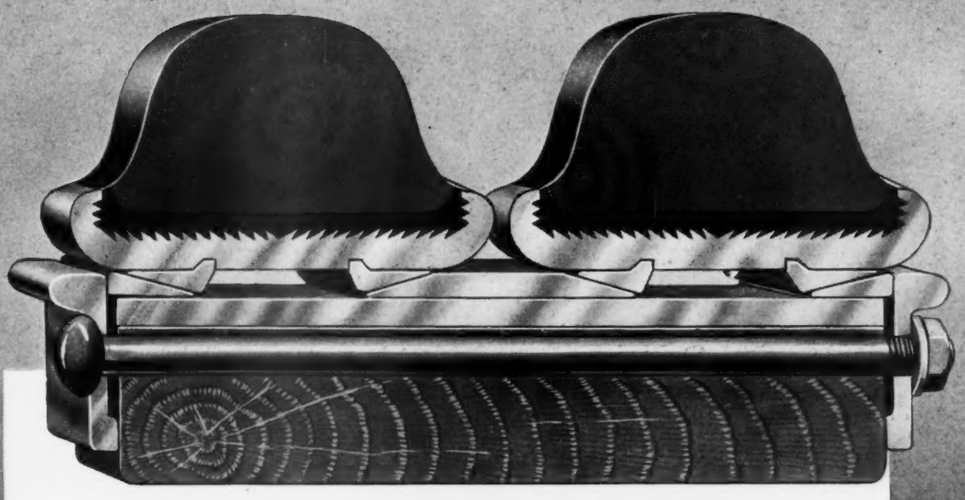
GIBNEY TIRE & RUBBER CO.

Factory, Conshohocken, Pa.

BRANCHES

New York, Philadelphia, Boston, Detroit, Chicago, Newark

AGENCIES—Washington, Baltimore, St. Louis, Kansas City, Minneapolis, Milwaukee, Cincinnati, Harrisburg, Norfolk, St. Paul, Duluth, Worcester, Elizabeth, Paterson.



GIBNEY
DEMOUNTABLE
WIRELESS TIRES

Dealers:

Our exclusive agency proposition is one of the ***real good*** opportunities in the automobile business, Gibney Tires having all the requisites necessary to establish a phenomenal business success.

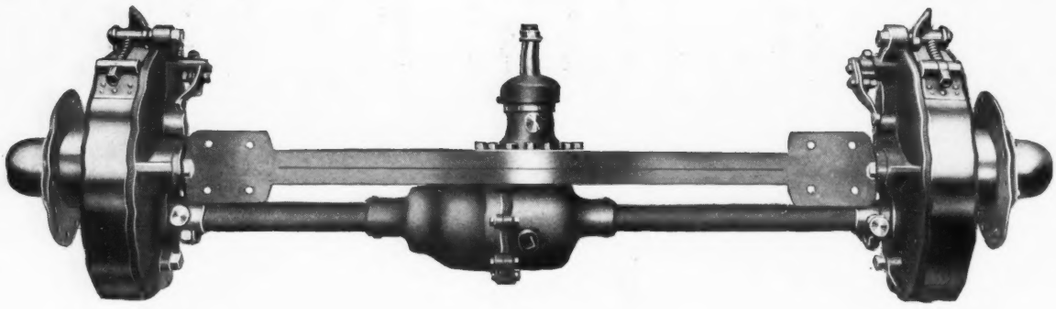
The quality of the materials entering into Gibney Tires, the advanced character of construction, the remarkable record they have established, their low mileage costs and the high regard in which they are held by users, make sales easy. Our exclusive agency proposition keeps all this growing business within your grasp and enables you to build up a profitable, permanent connection.

It is decidedly to your interest to learn the details of this proposition—***now!***

GIBNEY TIRE & RUBBER CO.
Factory, Conshocken, Pa.

BRANCHES
New York, Philadelphia, Boston, Detroit, Chicago, Newark

AGENCIES—Washington, Baltimore, St. Louis, Kansas City, Minneapolis, Milwaukee, Cincinnati, Harrisburg, Norfolk, St. Paul, Duluth, Worcester, Elizabeth, Paterson.



Torbensen Internal Gear Axles

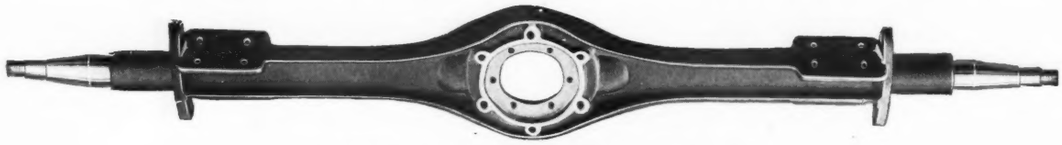
Will Put Your Truck in the Front Rank and Keep It There!

It is the Most Advanced Type of Heavy-Duty Axle Yet Developed—the Logical Installation for Trucks that are Built to Endure.

WHY THEY ARE BETTER

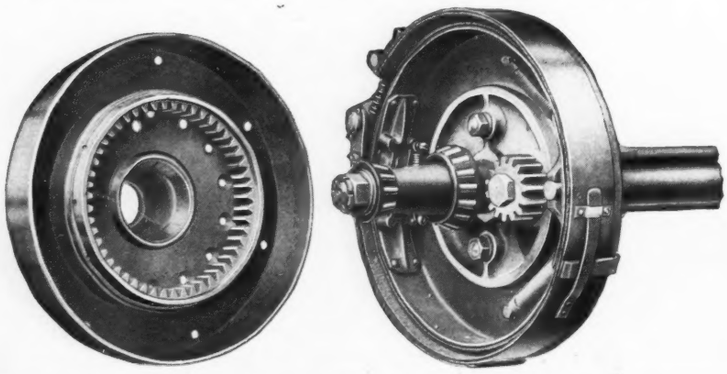
The solid member carries the load—the live axle transmits the power. The carrying member is a drop-forged I beam, with wheels running on roller bearings—it has greater strength and half the dead weight of a built-up axle of the worm or bevel types that do the double duty of carrying the load and transmitting the power. The jack shaft, or power-transmitting axle, is securely attached to the rear of this forging and this unit is relieved of all carrying strain by the I beam, leaving the jack shaft purely for the purpose of propulsion.

The final and main reduction is in the road wheels themselves and the power that turns them is applied not at the center, but out toward the rims, greatly increasing the effective leverage. The internal gear drive is the most positive and economical of all methods of power transmission. All torsion and radius rods are done away with and the spring seats are part of the I-beam forging. All the driving mechanism is enclosed, is thoroughly lubricated, **absolutely** quiet, and **always efficient** under **all conditions.**



WHY YOU SHOULD USE IT

Because truck axles that break and get out of alignment, and chains that rattle and break or wear out in short service are both out of date. And because competition is keen and the truck with the advanced features is the one that will win the big business. European engineers have long recognized that **commercial** cars must use **commercial** axles with the driving mechanism exempt from the heavy duty of carrying the load. The TORBENSEN Internal Drive Axle is **absolutely** and **solely** a **commercial** axle. It is designed for heavy duty and built for all capacities. The double axle is the logical solution of a problem that has caused the failure of many trucks in actual service. The built-up axle will not do whether used in connection with bevel gear, double reduction or worm drive—either strength is sacrificed or enormously excessive dead weight is carried.

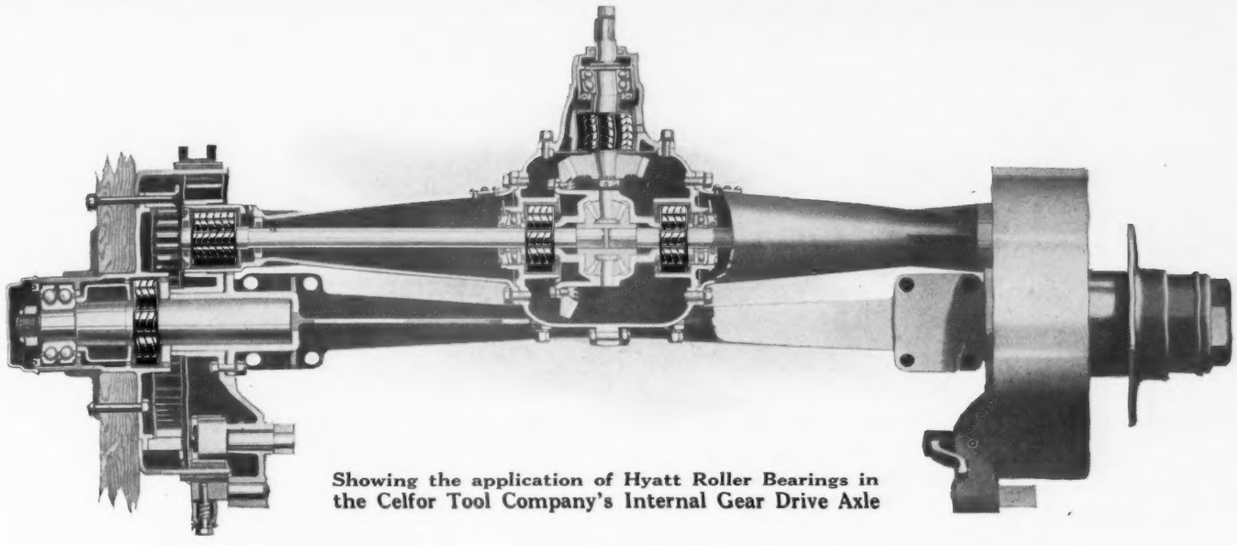


Our details and quotations will interest you—Write us for them

Torbensen Gear & Axle Company

216 to 228 High Street
Newark New Jersey

HYATT ROLLER BEARINGS



Showing the application of Hyatt Roller Bearings in the Celfor Tool Company's Internal Gear Drive Axle

FOR STRENUOUS SERVICE

IN transmissions—in the jackshafts—in live axles, in fact in the parts that get the hard service in Motor Trucks you will find Hyatt Roller Bearings.

The hollow Flexible Spiral Roller of Hyatt Bearings—renders them particularly fitted for this kind of hard service.

In the first place—Hyatt Bearings carry their load on a "full line of contact" instead of upon a "point" or "partial line of contact", as ball and solid roller bearings do.

The spiral Roller cushions the heavy road shocks, tends to keep gears and shafts in alignment—relieves the surrounding mechanism of undue strain—absorbs vibrations and thus reduces noise.

Hyatt Bearings are also self-oiling, as the hollow spiral roller carries a large quantity of the lubricant and the spirals alternating right and left spread the oil over the entire bearing surface.

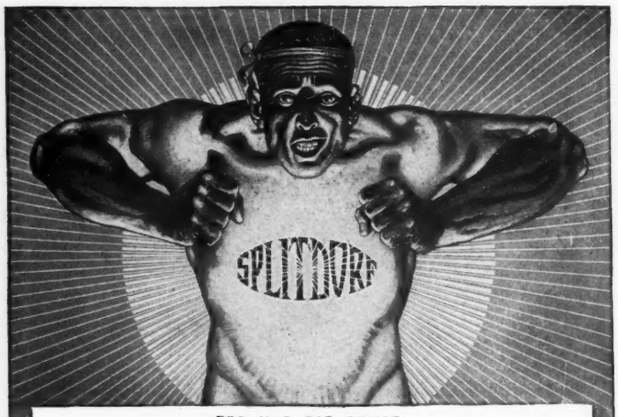
These exclusive Hyatt advantages are responsible for the fact that Hyatt Roller Bearings are used at points of great strain in all sizes and kinds of motor vehicles.

The Hyatt Engineering corps will co-operate with you to the fullest extent in adapting Hyatt Quiet Roller Bearings to your construction.

HYATT ROLLER BEARING CO.

DETROIT. CHICAGO
NEWARK, N.J.

When Writing, Please Say—"Saw Your Ad. in the C C J"



REG. U. S. PAT. OFFICE

Magneto ignition is highest grade equipment—saves you money every mile you ride and increases the efficiency of your car

SPLITDORF ELECTRICAL CO.
NEWARK, NEW JERSEY

ON THE JOB EVERY DAY

Day in and day out the year round your truck must be ready to do its work and do it at the least possible expense.

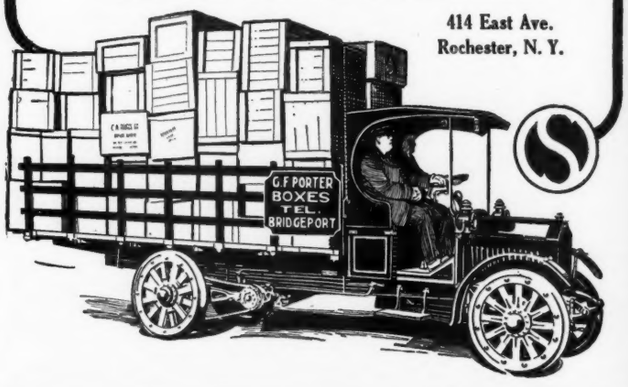
Selden Trucks

have invariably given this kind of daily service to their owners because they are built to stand the strain of continuous work. Every working part to the last bolt is larger and stronger than corresponding parts of any other 3000-lb. truck We invite comparison.

$500 Puts the $2000 Selden Truck into Service

The balance may be paid at the rate of $125 per month. The Selden Sales Plan as indicated above has proven very satisfactory to users and dealers alike. It will pay you to investigate the true merit of the Selden Truck and the plan by which it is sold.

SELDEN TRUCK SALES CO.
414 East Ave.
Rochester, N. Y.

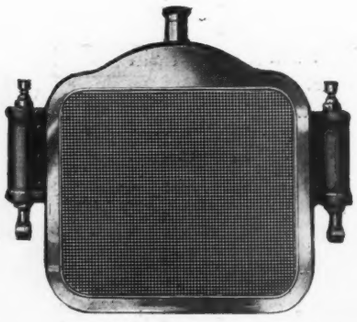


FEDDERS RADIATORS

Sometimes it takes a year or two for the quality of Fedders Radiators to become apparent.

Slowly but surely the absence of heating troubles brings to the motorist whose car is Fedders-equipped the realization that he has a radiator better than the ordinary.

The realization of Fedders Quality brings about satisfaction and there it stops. Complacent satisfaction is the hardest thing in the world to disturb—witness the continued patronage of many leading car makers whose regard for Fedders Quality indicates the opinion of their customers.



FEDDERS MFG. CO., Inc.
BUFFALO NEW YORK

SCHWARZ WHEELS

Patented Aug. 25th, 1904

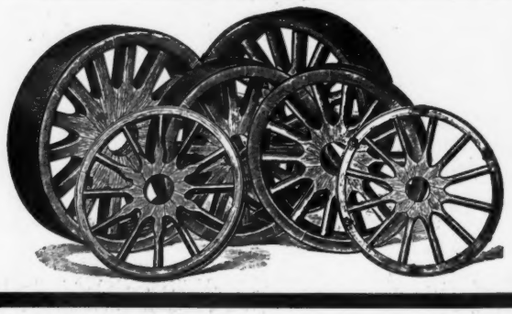
Used by the makers of most quality trucks, because they offer the utmost in strength, safety and economy.

Desired by truck buyers, because they are a known product whose superiority has been conclusively demonstrated.

Wanted by dealers, because they are an assurance of quality and make a truck easier to sell.

"Bear the Burden"—a booklet—will tell you why this is so—send for it.

The Schwarz Wheel Co.
Frankford Philadelphia Penna.



The A. B. C.

(*Audit Bureau of Circulations*)

is winning the unqualified approval of Advertisers, Advertising Agents, and Publishers

ADVERTISERS and Agents appreciate the A. B. C. service because it gives them information regarding circulations of the various media, which information they know is authentic, because it is subject to an annual audit by experts.

FOLLOWING are some expressions of approval of the A. B. C.:

"We are taking this opportunity to compliment you on the excellence of the A. B. C. service. The A. B. C. blanks are considered 'the court of last appeal' in this office, and a publication being a member of the Bureau puts the seal of approval on it."

—THE CARL M. GREEN COMPANY
Detroit, Mich.

"The A. B. C. service which we are receiving, to use a trite expression, seems to fill a long-felt want. We hope it will not be long before all publications will become members of your organization."

—FRANK PRESBREY CO.
New York

"We have not bought any space since the A. B. C. was started, but we shall closely interrogate all applicants for position in our list as to their having qualified for membership in your organization before putting them on." —NATIONAL LEAD COMPANY
New York

"You, of course, know the intense interest which I have had in common with a great many other advertisers in the creation of some machinery to develop standard methods of securing verified circulation statements. We will, of course, use your reports as the basis of our report consideration and shall be glad to know increase in the number of publications that come in."

HARRY TIPPER
THE TEXAS COMPANY
New York

"In laying out our advertising schedules for next year we purpose to base contract conditions on the facts given in the A. B. C. statements instead of on our own periodical data sheet statements."

GENERAL ELECTRIC COMPANY
Schenectady, N. Y.

THESE are only a few of many statements that the A. B. C. reports would be used as a basis for placing business in the future.

YOU, as an advertiser, should insist upon your right to know —when you buy white space and circulation—just what you are getting for your money. Insist that the solicitor who asks your patronage furnish you with an A. B. C. report of circulation. If he cannot, there's a reason—one which should make you hesitate before giving him a share of your patronage.

CHILTON publications are Charter Members of the A. B. C. The AUTOMOBILE TRADE JOURNAL was one of the first motoring publications to join. The COMMERCIAL CAR JOURNAL is the ***only*** truck paper to date which is a member. The A. B. C. auditors have just completed an exhaustive inspection of our records, and their report will soon be ready for distribution.

REMEMBER, when you buy space in CHILTON publications, you know you are actually getting that for which you pay.

MR. Russell Whitman, Managing Director of the A. B. C., 330 Railway Exchange Building, Chicago, will gladly supply any advertiser or publisher with full details. Better write him today.

A Shim Is—

As Necessary as a Wrench

Motor truck service is hard. Bearings frequently require adjustments. Shims are thus as necessary in the shop as a wrench. Make your shims from

LAMINUM
The MATERIAL for SHIMS

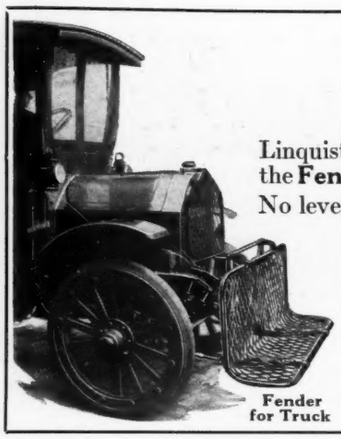
and you'll save time, trouble, labor and expense. Don't waste time filing a solid shim! Don't fool with troublesome loose-leaf shims! Don't waste money on new shims! Be economical. Be practical. Save time, labor, expense. Use LAMINUM! It's the work of a moment—just peel off with your knife enough of these .002" laminations to get the desired thickness. Result—a smooth surface, uniform thickness, perfect adjustment, an unspoiled bearing surface—a first-class job with little work or cost.

LAMINUM comes in various forms and thicknesses. We put up a trial assortment that will just suit you. Write for prices and data.

Laminated Shim Company, Inc.
539-41 Canal Street - New York

FRAMES
THE PARISH & BINGHAM CO.
CLEVELAND, OHIO

Our Entire Engineering Force is at Your Disposal



Fender for Truck

Saves Lives

Linquist Auto-Matic Fender and Brake **automatically** drops the **Fender**—puts on the **Brake**—and if desired, **Kills** the **Engine.**

No levers to bother with.

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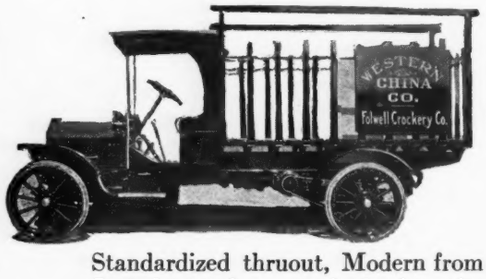

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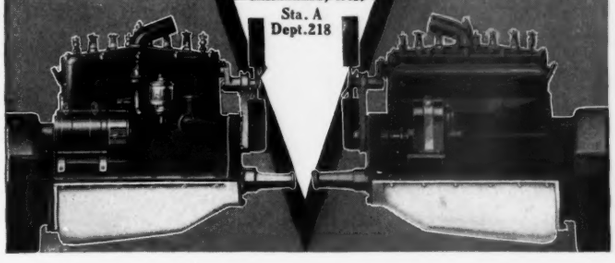

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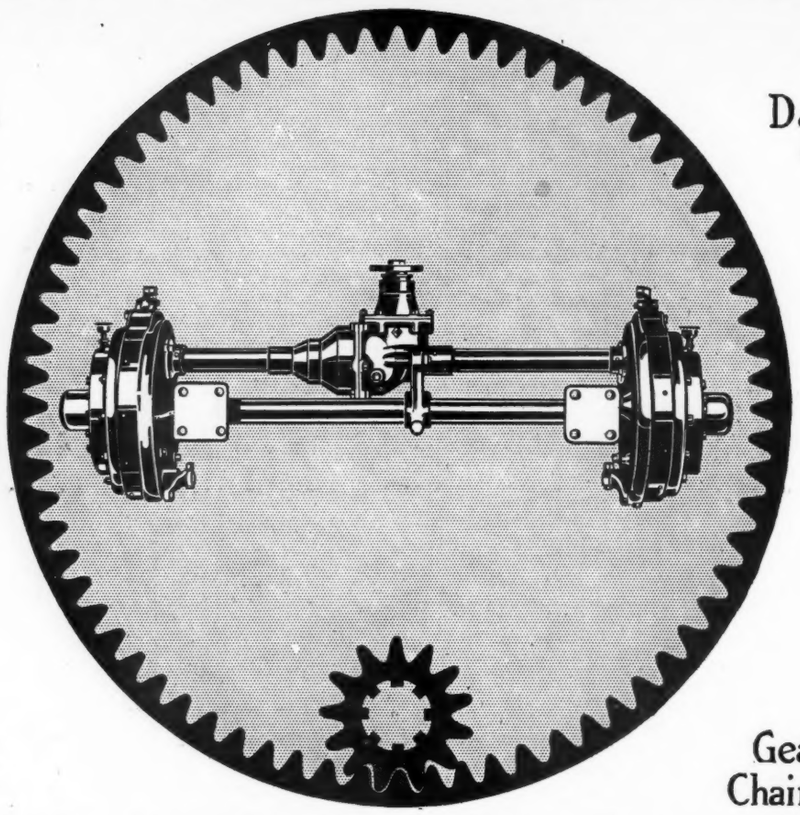

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The success of your truck depends upon your drive axle service. It is the most essential single feature of the motor truck.

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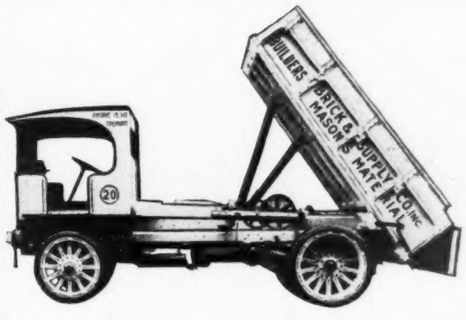

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adapted to their special work—strongly built, serviceable. Ideal for coal, building materials, etc. Combine gravity and elevating. One to ten tons capacity, side and rear delivery.

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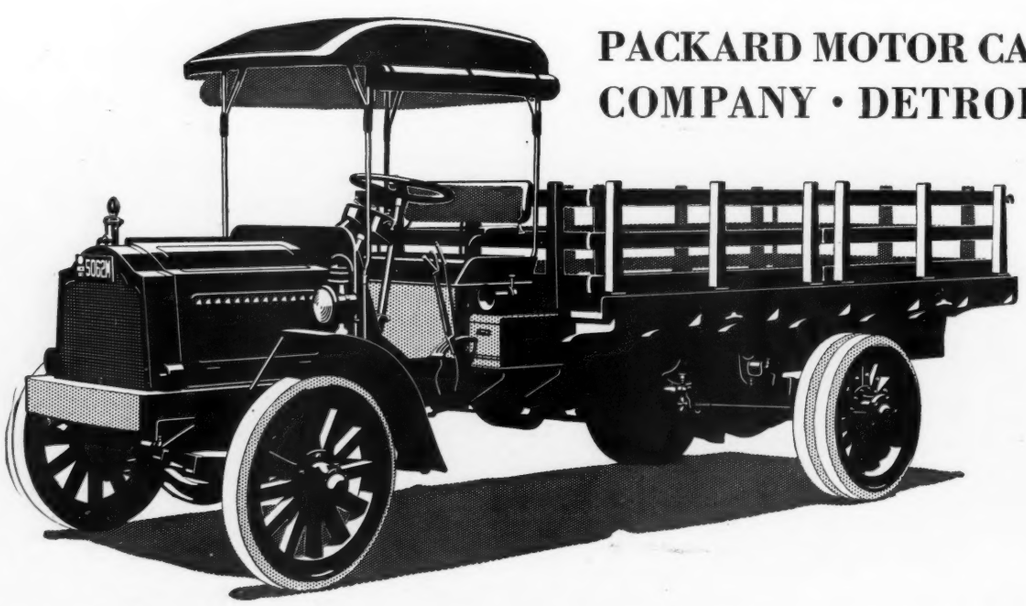

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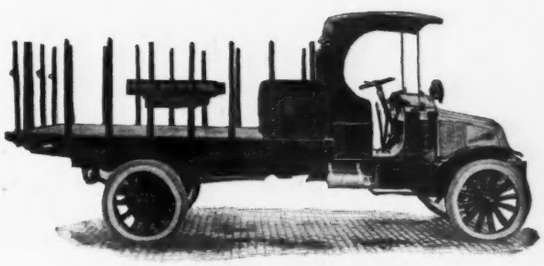
and It's Wonderful Automatic Governor

Sensitive Control, Closely Following the Road Conditions

as the truck encounters good roads and bad, up hill and down—every possible influence of surface and grade—leaving nothing for the driver to do but steer.

¶ We have been building motor cars and trucks since 1899 and this KREBS truck is by all odds the best commercial vehicle we have ever brought out.

¶ This is one of the 3 models. It is the Model H—two-ton truck. It is reinforced by Model G, one-ton truck, and Model F, three-quarter-ton truck.



Model H, 2-Ton Truck

¶ The control of the motor is taken care of by the KREBS Governor, an automatic device which operates like the unerring hand of an expert, maintaining the schedule under the changing conditions of the trip and at the same time economizing gas and saving the truck and tires. This device is not a mere speed-limit, but actually **governs** the entire handling of the motor. It sensitively and immediately corrects the spark advance and opens or closes the throttle, by gradual degrees, to meet the road conditions as they change from moment to moment.

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Dealers: **Write today for our terms and complete information**

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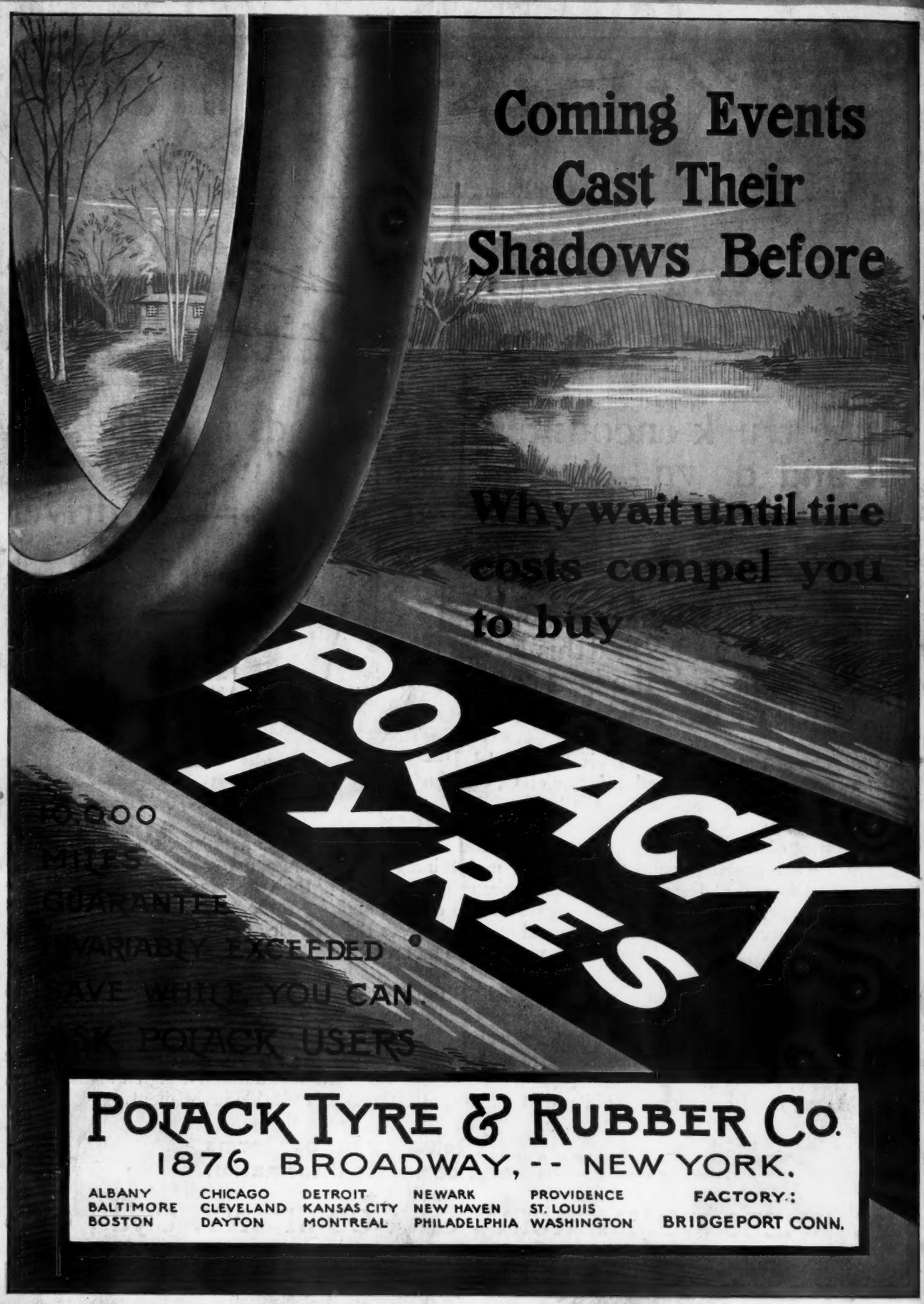
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